



PHD

**Explaining Individual Differences in Children's Emotions and Behaviour Following Routine Stressors**

**The role of cognitive appraisal, coping and cortisol**

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# **Explaining Individual Differences in Children's Emotions and Behaviour Following Routine Stressors: The role of cognitive appraisal, coping and cortisol**

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A thesis submitted for the degree of Doctor of Philosophy

University of Bath  
Department of Social and Policy Sciences

September 2013

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## ABSTRACT

Many children experience symptoms of mental health problems and a significant proportion reach clinical thresholds of psychological disorder. It has been argued that the rising incidence of these problems and widespread failure to scale effective treatments for those in need means that prevention and early intervention in the development of emotional and behavioural problems is a public health priority.

Child development is shaped by many forces, including for example parenting and peer relationships, this PhD is very specifically interested in the consequences of *stress* for children's emotions and behaviour. Although the effects of stress are largely deemed negative, striking individual differences are almost universally observed. In the context of equivalent stressors, some children experience poorer outcomes, some remain relatively unaffected and others appear to experience better outcomes. Understanding what causes these differences is important for advancing our knowledge of the stress process, and is also key to designing services to improve children's emotions and behaviour.

This PhD has four aims. Firstly, it examines the relationship between two routine, school-based stressors and children's emotional and behavioural outcomes. Secondly, it investigates the role of the cognitive appraisal process in accounting for individual differences in those outcomes. Thirdly, it examines the conditions under which cognitive appraisal operates, both in terms of its role as an organiser of coping efforts and cortisol (a stress hormone) as well as the extent to which children display consistency in their appraisals across contexts. Fourthly, it outlines the implications of the study for policy and practice efforts to improve children's emotions and behaviour.

The empirical study was designed as a prospective longitudinal study, following 66 children over the course of one year in which they experienced two routine, school-based stressors (KS2 exams and transition). Participants were recruited via opportunity sampling methods, and a combination of psychological and physiological data were collected at four time points.

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## LIST OF ABBREVIATIONS

**ACAPI** - Audio Computer Assisted Personal Interviewing

**ACTH** - Adrenocorticotrophic Hormone

**ANS** - Autonomic Nervous System

**AUCg** - Area Under the Curve in respect to the ground

**AUCi** - Area Under the Curve in respect to the increase

**CAR** – Cortisol Awakening Response

**CARAUCg** - Area Under the Curve in respect to the ground as applied to the CAR

**CARAUCi** - Area Under the Curve in respect to the increase as applied to the CAR

**CBT** – Cognitive Behavioural Therapy

**CNS** – Central Nervous System

**CRH** – Corticotrophin-Releasing Hormone

**CSCY** - Coping Scale for Children and Youth

**EBP** – Evidence-based Programme

**EBP4** – Evidence-based Programmes, Policies, Practices and Processes

**GxE** – Gene-Environment Interaction

**GAM** - General Appraisal Measure

**GLM** - General Linear Model

**HPA-axis** – Hypothalamic-Pituitary Adrenocortical-axis

**KS2** – Key Stage 2 examinations

**MBSR** - Mindfulness Based Stress Reduction

**PATHS** – Promoting Alternative Thinking Strategies

**PNS** – Parasympathetic Nervous System

**PTSD** - Post Traumatic Stress Disorder

**SAMA** – Stress Appraisal Measure for Adolescents

**SAM** – Sympathetic-Adrenal-Medullary-axis

**SDQ** – Strengths and Difficulties Questionnaire

**SEL** – Social and Emotional Learning

**SNS** – Sympathetic Nervous System

**SPSS** - Statistical Package for the Social Sciences

**SRRS** - Social Readjustment Rating Scale

**TFCB** - Trauma-Focused Cognitive Behaviour therapy



## **CHAPTER ONE: INTRODUCTION AND ORIENTATION**

### **1.1 BACKGROUND**

In the UK, one in ten children aged 11-15 experience mental health difficulties that are deemed serious enough to meet thresholds for specific disorders (Green et al., 2004; Meltzer, 2007). Mental health problems can be broadly categorised into behavioural or emotional problems (although in many cases they co-occur) (Collishaw et al., 2004).

Behavioural (or conduct) disorders are typically characterised by persistent and serious behaviour problems where developmental and social norms, or the rights of others, are violated. The symptoms of such disorders are often manifest in children's interactions with others and can include verbal and/or physical aggression, lying, cheating, bullying and oppositional or defiant behaviour (Goodman and Goodman, 2009). Behavioural disorders have potential to cause distress not only to the child but also to their peers, teachers, parents, siblings and wider society (Bywater and Sharples, 2012). Emotional disorders on the other hand refer to conditions such as depression and anxiety.

Depression is associated with persistent sadness, irritability, inattention, low self-esteem and withdrawal from social interaction (Brent and Weersing, 2008). Depressed children also experience low levels of energy, concentration and motivation. Children whose behaviour or emotions reach these clinical levels often experience great distress and impairment to their day-to-day living (Moffitt and Scott, 2008).

There are many more children and young people who experience milder problems (Ford and Ramchandani, 2009; Gonzalez-Tejera et al., 2005). For example, nearly two-thirds (60%) of adolescents report at least one symptom of depression and similar numbers (20%-59%) report having experienced prolonged periods of depressed mood (Compas, 1997). Although these problems do not meet criteria for a clinical diagnosis, they are still a cause for concern (Karevold et al., 2009). In one study of 11-15 year olds in the UK, the presence of a single symptom of depression was associated with problems at school (Harrington and Clark, 1998). In another study, children with just one or two symptoms of depression were also significantly more likely to be impaired than those without any symptoms at all (Brent and Weersing, 2008). Research also indicates that these isolated or minor symptoms often precede the development of psychological disorders (Thapar et al., 2010).

Emotional and behavioural problems such as those described can have detrimental consequences for children's overall development and life chances (Scott et al., 2001b). Those consequences include increased risk of disengaging from school or being excluded, not achieving academic potential (Green et al., 2005) and leaving education with no formal qualifications (Parry-Langdon, 2008; Richards, 2009). Furthermore, longitudinal studies reveal that emotional and behavioural problems experienced in childhood demonstrate strong continuities with mental illness in adulthood (Collishaw et al., 2007; Rutter, 1996; Rutter et al., 2006).

Thus, it is often argued that the mental health of children should be a priority for policy-makers (Grant et al., 2003). Aside from a moral and ethical obligation to provide services for children with mental health needs, there are significant financial incentives (particularly for preventive approaches). Children with emotional or behavioural disorders entail significant costs for the public purse (Knapp et al., 2011). For example, a follow-up study of children with conduct disorder revealed that by the time they reached 28 years of age, the costs incurred by various public service agencies (including health, education and youth justice) were 10 times higher than for children who did not display conduct disorders (Scott et al., 2001a).

It should be noted that there are many children in the UK who do not display either moderate or severe emotional and behavioural problems. Nevertheless, a number of questions have been posed in relation to the extent to which these children achieve their full potential or experience *positive* mental health (Huppert and So, 2011). These questions are largely driven by emerging research that suggests links between positive mental health and a number of desirable outcomes such as academic achievement, productivity and good quality, supportive relationships with others (Fledderus et al., 2010; Weare and Nind, 2011).

Identifying the factors and processes that contribute to children's emotions and behaviour, is a necessary precursor to designing effective programmes and policies that improve and promote these aspects of their development. A large body of research on child development tells us that emotions and behaviour are shaped by many forces (Costello et al., 2006), including for example parenting (Webster-Stratton, 1998) and peer

relationships (Toner and Heaven, 2005). This PhD is very specifically interested in the consequences of *stress* for children's emotions and behaviour.

Although the effects of stress are largely deemed negative, striking individual differences are almost universally observed (Ager, 2013; Flouri and Kallis, 2007; Franklin et al., 2012; Kudielka et al., 2009; Rutter, 2005; Rutter, 2012; Southwick and Charney, 2012).

Understanding what causes vulnerability (the experience of harmful effects) and resilience (remaining unaffected or experiencing beneficial effects) is important for advancing our knowledge of the stress process, and also highlights mechanisms through which it might be possible to intervene in children's lives to improve their emotions and behaviour and prevent mental health difficulties (Chang, 2002; Kraag et al., 2006; Timmermans et al., 2010).

## 1.2 AIMS AND KEY CONCEPTS

The thesis has several aims. Firstly, it examines the relationship between *routine* stressors and children's emotions and behaviour. Secondly, it investigates the role of the cognitive appraisal process in accounting for individual differences in those outcomes. Thirdly, it examines the conditions under which cognitive appraisal operates, both in terms of the role of appraisal as an organiser of coping efforts and cortisol (a stress hormone) and the extent to which children display generalised appraisal *styles*. Fourthly, it outlines the implications of the study for policy and practice efforts to improve children's emotions and behaviour and general mental health.

Stress is a complex concept with many different meanings and definitions (Arnold, 1990; Contrada, 2011; Levine, 1990). It is not uncommon, for example, to hear the terms 'stress', 'stressor', 'stressed' and 'under stress' used interchangeably (Jones and Bright, 2001). Within this thesis stress is conceptualised as a dynamic process that comprises different stages: (i) stressors, (ii) response processes and (iii) outcomes (Cohen et al., 1997).

**Stressors** are environmental demands that tax or exceed the adaptive capacity of an individual. The focus of this thesis is on ***routine stressors***: stressors that are common and experienced routinely by many children at similar ages and stages of development, such



as Key Stage 2 exams and the transition to secondary school (DiCorcia and Tronick, 2011; Masten, 2001; Rice et al., 1993; Seiffge-Krenke, 2001).

**Response processes** are psychological, biological and social processes that mediate the relationship between stressors and outcomes. **Cognitive appraisal** is the process of determining whether a given stressor is personally relevant, interpreting its meaning and then assigning it some value (Hood et al., 2009). This process involves a subjective evaluation of the significance and general positivity or negativity of the stressor as well as an assessment of personal capacity to cope with the demands posed (Hudek-Knezevic and Kardum, 2000; Lazarus and Folkman, 1984). *Threat* appraisals involve the perception of the potential for loss with little if anything to be gained in a situation, whereas *challenge* appraisals arise from the perception of some form of personal gain in the situation (Roesch and Rowley, 2005).

**Coping** is commonly defined as the cognitive and behavioural strategies individuals adopt to manage the external and/or internal demands of a stressful situation (De Ridder, 1997). Although there is some debate (Amirkhan and Auyeung, 2007; Boekaerts, 1996; Carver, 2011), the literature generally suggests that coping efforts directed towards dealing with the stressor result in better mental health outcomes than efforts directed at avoiding the stressor altogether (Clarke, 2006).

A range of biological stress response processes have been identified in the stress literature. This thesis is focused on the **Hypothalamic-Pituitary-Adrenal Axis (HPAA)** and specifically on the end-product of the HPAA; the stress hormone **cortisol**. Generally speaking, the perception of a stressor will trigger the HPAA to produce elevated levels of cortisol in an effort to mobilise extra physical resources that might support adaptation to the stressor (Gaab et al., 2003; Guttman and Nemeroff, 2011). However, it has also been noted that cortisol does not have a linear relationship with outcomes, significantly lower cortisol levels (sometimes referred to as a 'flattened' or 'dampened' cortisol response) can also be indicative of chronic stress and associated poor outcomes (Blair et al., 2011; Dallman and Hellhammer, 2011; Lovallo, 2011).

**Outcomes** refer to the sequelae of the stress process for children's health and development (the thesis specifically focuses on *emotions* and *behaviour*) as outlined in the beginning of this chapter.

Detailed explanation of the core concepts in this thesis (routine stress, cognitive appraisal, coping, cortisol, emotions and behaviour) is given throughout subsequent chapters and summarised in Table 1. It is also appropriate to clarify some of the terminology used throughout the thesis. 'Stress' encapsulates both stressors and processes set in motion by a stressor. To be 'stressed' means to be reacting to the environment but does not imply a particular positive or negative outcome. For ease, the term 'cortisol' will sometimes be used to describe a process, though technically it is the end-product of the physiological process under study - the Hypothalamic-Pituitary-Adrenal Axis (HPAA). It is also worth noting that in relation to outcomes of the stress process, the study is concerned with children's emotions and behaviour, though sometimes mental health or psychological outcomes will be used. The term outcome is itself has various connotations within the social sciences, but in this thesis it refers very specifically to the outcomes of the stress process.

### **1.3 THE EMPIRICAL STUDY**

An empirical study was designed to investigate individual differences in children's responses to routine stress and to examine the extent to which cognitive appraisal, coping and cortisol account for those differences. The research questions and associated hypotheses are as follows:

***Q1. What is the impact of two routine stressors (exams and transition) on children's emotions and behaviour and how much variation is there?***

**H<sub>1</sub>:** On average, there will be moderate increases in emotional and behavioural problems at exams and transition compared to baseline. Within this overall trend there will be individual variation: some children will experience an increase in difficulties, others will experience a decrease in difficulties and for some children their emotions and behaviour will remain stable.

**Table 1: Key concepts and their operational definitions (cont'd on next page)**

CONCEPTS	CONSTRUCTS AND DEFINITIONS
<b>Stressors</b>	
<u>Routine stressors:</u> Routine stressors are those stressors that are common and experienced routinely by many children at similar ages and stages of development	<u>Exams:</u> Compulsory Key Stage 2 SATs exams in Year 6 of primary school  <u>Transition:</u> The compulsory transfer from primary to secondary school
<b>Outcomes</b>	
<u>Mental Health:</u> The sequelae of stressors for children's mental health.	<u>Emotional difficulties:</u> Symptoms commonly include persistent sadness, irritability, inattention, low self-esteem, withdrawal from social interaction, low levels of energy, poor concentration and low motivation  <u>Behavioural difficulties:</u> The symptoms are often manifest in children's interactions with others and are known to include verbal and/or physical aggression, lying, cheating, bullying and oppositional or defiant behaviour
<b>Stress response processes</b>	
<u>Appraisal:</u> To cognitively appraise a stimulus (stressor) is to determine if it is personally relevant, to interpret its meaning and to assign some value whether positive or negative, to a situation. Appraisal is a mediator of the relationship between stressors and outcomes	<u>Primary appraisal:</u> Primary appraisal is an initial assessment of the significance of a situation to personally held values, goals, beliefs, commitments and intentions. It is an assessment of whether what is happening is worthy of attention and if it requires action  <u>Secondary appraisal:</u> Secondary appraisal is an assessment of what can be done to manage the demands of the stressor and the identification of any possible constraints to coping actions, based on the appraiser's own abilities and resources (B1). It involves assessing what can be done about the stressor, reviewing potential coping strategies and resources, constraints against acting them out, and expectations about the outcomes of such actions

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**Coping:**

The cognitive and behavioural efforts individuals exert to manage the external and/or internal demands of a stressful situation. Coping is a mediator of the relationship between appraisal and outcomes

**Approach coping strategies:**

Approach strategies on the other hand, being behavioural, cognitive and emotional activities oriented toward a stressor - attempts to change the way you think about the problem, behaviour that focuses directly on the problem to solve it

**Avoidance coping strategies:**

Avoidance comprises activities oriented away from a stressor in order to avoid it such as not thinking about the stressor or behavioural attempts to escape the situation

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**Cortisol:**

Cortisol is a hormone that plays an important part in synchronising bodily functions around the 24-hour light/dark cycle. Under conditions of stress the brain is stimulated to increase the level of cortisol that is secreted by the pituitary glands. Cortisol is a mediator of the relationship between appraisal and outcomes

**Diurnal profile:**

The pattern of cortisol secreted by an individual over the course of 24 hours. Large amounts are produced in the second half of the night with peak levels occurring in the early hours of morning - specifically within the first 30-45 minutes of waking Throughout the remainder of the day cortisol levels steadily decline reaching their lowest levels in the first half of the night (Fries, 2009)

**Cortisol awakening response (CAR):**

A period of cortisol secretory activity in the first 45-60 minutes immediately post-awakening

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***Q2. Does cognitive appraisal account for variation in children's emotions and behaviour in the context of routine stress?***

**H<sub>2</sub>:** Differences in cognitive appraisal will explain a proportion of the variation in children's emotions and behaviour. Positive appraisals, such as challenge and resources to cope, are expected to be associated with fewer emotional and behavioural difficulties. Whereas negative appraisals such as threat and no resources to cope will be associated with greater difficulties.

***Q3. Is the relationship between appraisal, emotions and behaviour partially mediated by coping and cortisol?***

**H<sub>3a</sub>:** The effects of appraisal will be partially mediated by the types of coping strategies that children deploy in the context of each stressor. Challenge and resources to cope appraisals will lead to the enactment of active strategies such as problem-solving and

assistance seeking, which will in turn increase the chances of children experiencing fewer emotional and behavioural difficulties. Threat and low resources to cope on the other hand will be associated with passive and avoidant coping strategies that in turn increase the likelihood of children experiencing greater difficulties.

**H<sub>3b</sub>:** children will experience disruption to their HPAA functioning during the exams and transition, as indicated by a detectable rise in the concentration of cortisol in their saliva at mid-stressor timepoints (when compared to baseline pre-stressor levels)<sup>1</sup>. It is also hypothesised that a small proportion of children will display a ‘dampened’ cortisol response indicative of chronic stress.

**H<sub>3c</sub>:** It is hypothesised that the relationship between appraisal and children’s outcomes will be partially mediated by cortisol. Negative appraisals (threat and lack of resources) will be associated with higher levels of cortisol (at both awakening and during the day), that in turn increase the likelihood of children experiencing greater emotional and behavioural difficulties. Positive appraisals (challenge and resources to cope) on the other hand are likely to be associated with lower levels of cortisol (but not with a flattened/dampened pattern), which will in turn increase the chances of children experiencing fewer emotional and behavioural difficulties.

***Q4. Do children display consistency in the types of appraisal they make in response to different stressors?***

**H<sub>4</sub>:** Children will differ in the degree to which they display consistency in the types of appraisal they make in response to different stressors. Some children will display a challenge-oriented appraisal style (comprising consistent challenge and perceived resources to cope appraisals). Other children will demonstrate a threat-oriented appraisal style (comprising high levels of threat and low levels of perceived resources to cope). Other children will not be consistent in the types of appraisal they make.

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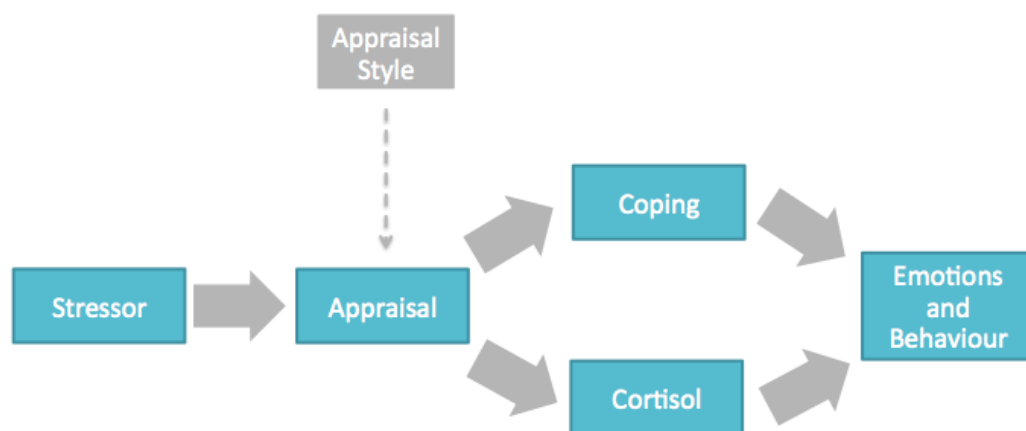
<sup>1</sup> Conceptually, it is important to determine whether children are physiologically responsive to the routine stressors under study before it is possible to determine if the relationship between children’s appraisals of those stressors and their emotional and behavioural difficulties are partially mediated by levels of the stress hormone cortisol.

**Q5. What is the relationship between appraisal style, emotions and behaviour?**

**H<sub>5</sub>:** Children with a challenge-oriented appraisal style will have fewer emotional and behavioural difficulties than both children with a threat-oriented appraisal style and those children who do not display an appraisal style.

The questions and hypotheses just described test a model of children's stress response as summarised and depicted in Figure 1.

**Figure 1: Hypothesised model of children's stress response**



It is important to note that a positivist framework has been employed for this study as, I would argue, it is the most appropriate method with which to address the specific research questions posed (in *Chapter Eight* there is a discussion of how the study leads to several research questions that would be best addressed using qualitative methods). The research design comprises a prospective longitudinal study, following 66 children over the course of one year in which they experienced two routine, school-based stressors (exams and transition). Participants were recruited via opportunity sampling methods, and a combination of psychological and physiological data were collected at four time points.

#### **1.4 GAPS IN THE LITERATURE**

Studies of stress in children have tended to focus on the sequelae of artificial laboratory-based stressors or catastrophic life events (Brown, 1990; Cicchetti and Toth, 2005;

McNamara, 2000; Schneiderman et al., 2005; Seiffge-Krenke, 1993; Shaw, 2003). Less attention has been paid to *routine* stressors and the myriad of normative life events that children experience as a matter of course throughout childhood (Fields and Prinz, 1997; Rossman et al., 1997; Ryan-Wenger et al., 2000).

Previous research suggests that routine stressors have relatively small negative effects on children's emotions and behaviour, however it has been suggested that those small effects can be functionally impairing for children (Ford and Ramchandani, 2009). Yet the literature also points to the possibility of positive outcomes following stress; some children appear to demonstrate improved mental health as a result of exposure to routine stressors (Seery et al., 2010). Indeed, researchers have presented compelling arguments for the role of such stressors in building the capacities, skills and competencies that might enable a child to be a resilient in the context of extreme life stress (Garmezy and Masten, 1990; Masten, 2001; Martin, 2013).

What causes the difference between negative and positive outcomes in stressful contexts? Why do some children appear vulnerable to routine stressors and why are others more resilient? There are strong theoretical arguments to suggest that this variation can be explained by a range of stress response processes that mediate the relationship between stressors and children's emotions and behaviour (Grant et al., 2006; Rutter, 2013).

Research on stress in adults (Harvey et al., 2010; Pakenham and Rinaldis, 2001), and a growing number of studies involving children (Grych et al., 2003; Harold et al., 2007; Hood et al., 2009; Ryan-Wenger et al., 2000) suggest that the cognitive appraisal process is a key mediator of psychological responses. Challenge appraisals are associated with better mental health outcomes in the context of a variety of different stressors, whereas threat appraisals are associated with greater mental health difficulties.

It has also been proposed that cognitive appraisal influences outcomes in this way because it *organises* a range of other stress responses (Denson et al., 2009; Grych, 1998) including coping efforts and a range of physiological mechanisms such as the HPA. Notwithstanding substantial theoretical posturing, empirical evidence that different types

of appraisal interact with coping and cortisol is not forthcoming and studies of these mechanisms in children and adolescents are lacking (Brodinzensky et al., 1992; Rutter, 2012; Zalewski, et al., 2011).

Another key question remaining unanswered relates to the extent to which it might be possible for children to develop generalised *styles* of appraising different stressors (Hood et al., 2009; Roesch and Rowley, 2005; Rowley et al., 2005). There is a great deal of evidence from the broader psychological and child development literature to suggest that individuals do demonstrate consistency across different situations (Abela and Sullivan, 2003; Dweck et al., 1995; James et al., 2004; Park, 2010), but few studies focus specifically on consistency in the cognitive appraisal process. It has been proposed that a generalised appraisal *style* might represent one mechanism through which successful adaptation to routine stressors leads to resilience in the context of subsequent stressors.

The cognitive appraisal process together with coping and cortisol may explain a significant proportion of the variance in children's outcomes following exposure to equivalent stressors. Surprisingly however, there is very little data to support or refute the proposition and very few studies that investigate all three processes simultaneously (Contrada, 2011). In addition to addressing a gap in the literature, empirical evidence of the contribution made by appraisal, coping and cortisol to children's emotions and behaviour in the context of routine stress will shed light on the mechanisms through which we might intervene to promote positive outcomes.

As outlined earlier in this introduction and described at various points in this thesis, many children experience symptoms of mental health problems and a significant proportion reach clinical thresholds of psychological disorder (Collishaw et al., 2004). It has been argued that the rising incidence of these problems and widespread failure to scale effective treatments for those in need means that prevention of (and early intervention) in the development of emotional and behavioural problems is a public health priority (Weist et al., 2007; Weare and Nind, 2011; Ager, 2013). Pragmatic interventions designed to target problems early in their development with potential to reach large numbers of children are needed. A review of the stress management literature suggests that there



are few examples of such programmes and fewer still that have a robust evidence base (Calear and Christensen, 2010; Kraag et al., 2006; Mychailyszyn et al., 2012).

## 1.5 CHAPTER OUTLINE

**Chapter One** introduces the rationale for the study in the form of a range of statistics on the troubling levels of emotional and behaviour difficulties experienced by UK school children. The key concepts explored in this thesis are defined and the study aims, questions and hypotheses are presented. This chapter also briefly highlights gaps in research literature that the study attempts to address.

In **Chapter Two** different approaches to stress including environmental, psychological and biological perspectives are described and critiqued. The conceptual framework and operational definition of stress adopted for this thesis is also outlined.

**Chapter Three** reviews empirical evidence on the relationship between stressors and outcomes, highlighting significant individual variation and the potential for both negative and positive psychological outcomes following exposure to stress. This chapter also marks out the distinction between acute and routine stressors and presents arguments for researchers to pay greater attention to the latter.

**Chapter Four** describes the cognitive appraisal process and reviews evidence for the role it plays in explaining individual differences in children's outcomes following exposure to stress. This chapter also explores the extent to which cognitive appraisal might act as an organiser of other stress response processes, specifically coping and cortisol.

The cognitive appraisal process is also the focus of **Chapter Five**. This chapter presents the concept of appraisal style and weighs arguments for and against cross-situational consistency in the appraisal process. The limited empirical evidence on this topic is also reviewed.

**Chapter Six** describes the epistemological and ontological framework within which the study is located. The research design, sampling, measures, data collection methods, ethics, data preparation and analytical procedures are outlined.

The results of the study are presented in **Chapter Seven**. The chapter is structured into sections pertaining to each of the research questions and associated hypotheses. Interim summaries are presented at the end of each section.

The findings are interpreted and discussed in **Chapter Eight** and contextualised in relation to existing knowledge about the stress process in children. The strengths and weaknesses of the study, in addition to the novel contributions of the work and recommendations for future research are addressed at the end of this chapter.

In **Chapter Nine** a series of recommendations for policy and practice are made. Those recommendations focus on the potential for a universal, school-based, stress management training programme that could be designed to utilise routine stressors as context for enabling children to develop a positive style of appraisal.

## CHAPTER 2: CONCEPTUALISING STRESS

### 2.1 INTRODUCTION

Stressful life experiences are a proven threat to children's healthy development. Studies have documented links between different stressors and an array of poor outcomes. However, not all children succumb to the threat posed by stress; researchers consistently report individual differences in children's outcomes following stressful experiences (e.g. Bonanno, 2004; Flouri and Panourgia, 2011; Seiffge-Krenke et al., 2001; Southwick and Charney, 2012).

This thesis explores the extent to which the way children think or more specifically the way they *appraise* stressors explains variation in their outcomes following exposure to routine stress (both directly and indirectly through relationships with coping and cortisol). As a universal human experience, stress has been of interest to a variety of philosophers, scientists and commentators (Jones and Bright, 2001). It is therefore essential that any study of the relationship between stress and outcomes sets out the specific conceptual framework within which it is situated (Folkman, 2009).

This chapter outlines a contemporary model of stress and briefly describes the different theoretical approaches it draws on. The fundamental assumptions underpinning the model are presented towards the end of the chapter as well as an exposition of how the framework has been applied to the empirical study at the heart of the thesis.

The literature synthesised in this chapter (and throughout following chapters) was identified following searches on key bibliographic and academic databases including Web of Science, PsycInfo and Scopus using key terms such as 'stress', 'stressful life events' 'childhood stress', 'cognitive appraisal', 'appraisal style' 'coping', 'cortisol', 'HPAA' and other terms relevant to this thesis. Journal papers and books were reviewed. Material of international origin was reviewed though literature written in languages other than English was not consulted. Sources were also identified and directly searched for using the reference lists of key papers and texts. This chapter provides a somewhat historical (but also necessary) account of conceptual approaches to stress and thus some references may appear dated. Generally, literature from the last 15 years was deemed

relevant in later chapters with the exception of some particular topics that have received very little attention in this time period. As will be discussed later in the thesis, the childhood stress literature has lagged behind research on stress in adults.

## 2.2 DEFINING AND CONCEPTUALISING STRESS

In this thesis, stress is conceptualised according to the definition proposed by Cohen et al. (1997) who described stress as “a process in which environmental demands tax or exceed the adaptive capacity of an organism, resulting in psychological and biological changes that may place persons at risk for disease” (Cohen et al., 1997b p.3). One significant feature of this definition is the emphasis on *process*; in other words that stress is comprised of a series of components or stages each of which interacts with the other. Those stages are (i) exposure to a **stressor** as described by Cohen et al. as “environmental demands (*that*) tax or exceed the adaptive capacity of an organism”; (b) psychological and biological response **processes**, described as “psychological and biological changes”; and (c) **outcomes** referring to the sequelae of the stress process; Cohen refers specifically to “disease” though it is important to note that this thesis is specifically interested in children’s psychological outcomes.

This is one way to conceptualise stress; there have been many other definitions (see Contrada, 2011; Jones and Bright, 2001). Historically, these varying definitions reflect conflicting views about whether emphasis should be placed on the environmental, psychological or biological qualities of ‘stress’. Hence this chapter reviews the environmental and life events perspective, psychological perspective and the biological perspective of stress. It has been argued that these individual approaches have significant limitations when applied in isolation (Grant et al., 2011), whereas when integrated into one over-arching framework (such as that proposed by Cohen et al., 1997b) they provide a solid foundation for understanding the reasons why children respond differently in stressful situations.

A full exposition of the different approaches can be found elsewhere (Cohen et al., 1997a; Contrada, 2011; Cooper and Dewe, 2004; Jones and Kinman, 2001). However, it is relevant for this thesis to briefly outline how stress is conceptualised within each perspective and the ways in which individual differences in the stressor-outcome

relationship have been accounted for. Each of the three theoretical approaches are the building blocks of the framework adopted here.

### **2.3 ENVIRONMENTAL AND LIFE EVENTS PERSPECTIVES**

Life events research represents a sizeable portion of the stress literature. Whilst all definitions of stress contain an environmental component, some models differ in the extent to which they emphasise the psychological and physiological processes that mediate the relationship between environmental stressors and outcomes (Sandberg and Rutter, 2008). The primary aim of the life events (or environmental) approach, by contrast, is to identify the *objective external conditions* (stressors) that promote stress and lead to disease (Cohen, et al. 1997). Thus, the life events approach defines stress in terms of quantifiable, objective environmental conditions and does not directly address internal processes.

Life events researchers are responsible for several conceptual and empirical advances in our understanding of stress. They were amongst the first, for example, to demonstrate empirical links between psychosocial stressors and health (Turner and Wheaton, 1997). Significant strides were made by Adolf Meyer (1951), a psychiatrist and physician, who theorised that stressful life events factor in the development and maintenance of *physical* illness. Meyer developed a tool to enable doctors to collate information about a patient's life history and explore links with health conditions. The 'life chart' plotted significant life events, such as job changes, marriage or bereavements, on a timeline against which the onset and duration of symptoms or disease were mapped. Subsequent empirical research on life charts provided some of the earliest concrete evidence that significant life events often precede the onset of illness (Cohen et al., 1997b; Cooper and Dewe, 2004).

Since Meyer's early work, relationships between stressful life events and both physical and mental health have been established. Studies of children and adolescents indicate that stressful life events are markers for increased risk of physical and psychological problems across development (Grant and Compas, 1995). Barr et al. (1996) for example report that the duration and severity of respiratory illnesses experienced by pre-school children is positively correlated with parent reports of stressful life events in the child's

recent past. Dumont and Provost (1999) also documented links between stressful life events and the symptoms of adolescents experiencing anxiety and depression.

Whilst empirical links between psychosocial stressors and health continue to be demonstrated, individual variation is consistently reported. Different views have arisen within the life events approach regarding the identification of characteristics of environments that promote stress and vulnerability (Turner and Wheaton, 1997). One of the first and most significant findings to emerge from the life events literature is that the short-term *accumulation* of stressors is associated with greater risk of acute and chronic alterations in health status (Barr et al., 1996).

The greater the number of stressors a person is exposed to within a specified period of time, the more stressed they are and the higher their chances of experiencing health problems (Flouri, 2008; Seiffge-Krenke, 2000). The data supporting this finding were collected primarily via checklist tools comprising lists of stressful events and circumstances (Grant et al., 2011). A notable example is the work of Holmes and Rahe (1967) and the development of the *Social Readjustment Rating Scale* (SRRS); a checklist containing 43 life event items such as a 'child leaving home', 'trouble with in-laws' and 'change in financial state'. Participants self-report which of the events they have experienced recently and their responses are summed to yield a summary score of the 'stressfulness' of changes experienced within the time-range specified (Wethington et al., 1997). Research using checklists such as the SRRS have documented that those who experience greater numbers of stressful life events are more likely to experience hypertension, heart disease, cancer and other problems of psychological origin than those who experience relatively fewer events (Turner and Wheaton, 1997).

The notion of cumulative risk is also apparent in current epidemiological studies of the causes of psychological and physical disorder (Flouri & Kallis, 2007). Grant (2004) for example, describes evidence that the increased rates of psychological disorder found in adolescent populations (compared to younger children) is partly explained by the increased rates of exposure to stressors for this age group, such as academic and peer pressures as well as pubertal changes.

Another conceptual advance made by life events researchers, was a shift from thinking purely about the accumulation of events to considering the particular *qualities* of events that make them more or less stressful (Aneshensel, 1992; Compas, 1987; Holahan and Moos, 1987; Moos and Swindle Jr, 1990). The establishment of the *magnitude* of adjustment required by a stressor as a significant influence on outcomes is another important development within the life events literature. Notably, the SRRS was revised to take into account the size of the adjustment required by each event listed on the checklist. It was observed that some events involved more change than others, a holiday cannot be described as life altering but the death of a spouse could, for example. The magnitude of the event was defined in terms of the demands it placed on an individual's adaptive capacity (see Holmes and Masuda, 1974). Events that place excessive demands on an individual's ability to cope, such as divorce and personal injury are considered to have greater detrimental effects (Cohen et al., 1997b; Cooper and Dewe, 2004; Grant et al., 2003).

Furthermore, sociologists Brown and Harris (1978) argued that life events do not occur within 'a socio-economic vacuum' and that the personal and social contexts within which stressors occur are vitally important (Ice and James, 2007). They argued that stressors can be categorised according to the level of "contextual threat" that they pose (Wethington et al., 1997). The threat rating attached to an event is related to the *typical* response of an *average* person to a stressor occurring in a specific set of biographical and social circumstances. Brown and Harris (1978) compiled "dictionaries" of contextual threat ratings that were used to determine a benchmark against which a subject's experience could be mapped. Crucially, they argued that stressors that compromised the most keenly felt emotional commitments and roles were deemed the basis for the experience of severe stress, and only severe stress harms health (Brown and Harris, 1986). It is important to note that an individual's personal, emotional and subjective reaction to a particular event was not considered important, instead the threat rating attached to an event is related to the *typical* response of an *average* person to a stressor occurring in a specific set of biographical and social circumstances (Brown and Harris, 1989).

Despite the significant contribution made to our understanding of stress, life events research is widely criticised. Critics argue that the approach has driven research on high-

impact experience to the detriment of more normative experiences (Stallard et al., 1999). There are well established literatures, for example, on the impact of disasters such as floods (Green et al., 1991) and earthquakes (Pynoos et al., 1993), as well as divorce (Mazur et al., 1999), parental conflict (Grych et al., 2003), maternal deprivation (Beckett et al., 2006) and military conflict (Schok et al., 2008) on children's health and development. Relatively fewer studies have been published on the impact of more routine and commonly experienced stressors such as transition to school, exams, and moving house (Sandberg and Rutter, 2008).

Another major criticism of the life events approach is that much of the research linking stressors or events with outcomes is correlational and the possibility that there might be other factors that mediate the relationship between stressors and outcomes is frequently disregarded (Cohen et al., 1997b). Life events researchers focus almost entirely on the *environmental* factors that promote vulnerability and do not acknowledge the potential psychological and physiological *processes* that might intervene between exposure to a stressor and subsequent outcomes. The work of Mayer (1951), Holmes and Rahe (1967), and Brown and Harris (1986), for example, assumed a direct link between external conditions and health outcomes.

Within this framework, subjective or reactive processes such as the way people think about impending stressors, the coping strategies they enact and their biological responses are described as potential confounds or 'contaminants' (Dohrenwend et al., 1984; Pollock, 1988). Although life events researchers acknowledge that the amount of adjustment required might vary in different circumstances, the amount was deemed the same for everyone; individual differences were considered an artefact of measurement error.

This view stands in stark contrast to substantial research evidence that people are capable of reacting in different ways to the same stressor and that those differences cannot be accounted for by variation in environmental circumstances alone. As Clow (2004) explains "the experience of stress is complex and subjective. The problem of quantification is complicated by large individual differences in the extent to which



stressors illicit stress responses: the experience of stress is not directly proportional to the stressful event that causes it” (Clow, 2004 p.10).

## 2.4 PSYCHOLOGICAL PERSPECTIVES

Another key theoretical approach to stress is the *Transactional Theory of Stress and Coping* (Lazarus and Folkman, 1984). Transactional theory marks a departure within the stress literature from the life events approach; where the latter focused on objectively defined external conditions, the transactional theory instead posits that a situation or event can only be described as stressful if a person subjectively appraises it as such (Hudek-Knezevic and Kardum, 2000).

According to this perspective, stress is a transaction between a person and their environment and indeed stress only arises when an individual *subjectively* perceives the transaction as taxing (or exceeding) their resources to cope and therefore a potential danger to their well-being (Lazarus and Folkman, 1984). A strong emphasis is placed on the process of cognitive appraisal - the manner in which people think about, interpret and perceive their environment and the stimuli that impinge upon them (Steptoe and Vogele, 1986).

While the approach focuses on internal psychological conditions, it is important to note that the significance of environmental conditions is also acknowledged in transactional theory (Lazarus, 1999). Lazarus and Folkman (1984) describe the transactional approach as a ‘modified subjectivism’ and explain that “to say that the reaction to demanding or hostile environments is mediated by cognitive processes is not to say that inner promptings *alone* shape appraisals, but that such promptings interact with the objective environment in generating cognitive appraisals” (p.47). Cognitive appraisal is thus constrained by the objective, real, conditions a person is situated within.

Although not the only psychological or cognitive approach to understanding stress, see for example Antonovsky (1996), many studies operationalise stress in transactional terms (see Grant et al., 2006). Whilst much of the empirical research has focused on clarifying the types and components of appraisal (Roesch et al., 2002), there is a small empirical literature linking appraisal to outcomes in a number of stressful contexts (Hood et al.,

2009; Park, 2010). Thus it could be argued that the contribution of this approach to the stress literature has been largely theoretical and there remains a dearth of evidence for the mediating role of appraisal in the relationship between stressors and psychological outcomes.

One of the key strengths of the transactional approach was the ability to shed light on the “black box” in the stressor-outcome relationship (Cohen, et al., 1997). Transactional theorists were amongst the first to propose that there was a mechanism connecting stressors to outcomes and that this mechanism was a source of individual differences (Smith and Kirby, 2011). The significance of this development is perhaps best considered within the historical context in which it occurred. Originated by Lazarus and Folkman (1984), transactional theory was developed partly in response to the inability of stimulus-response models in life events research to explain individual differences in the stressor-outcome relationship. It was also part of a much broader, and at the time radical, movement within psychology that shifted attention away from behaviourism and towards cognition. The so-called ‘new look’ psychology proposed that individual differences in mental or cognitive processes were an important link between stimulus and response models of behaviour (Cooper and Dewe, 2004).

As has been stated, one of the most important contributions of the transactional approach to our understanding of stress was the promotion of *process* so that unlike life events research, individual differences could be accounted for in a meaningful way (Cooper and Bright, 2001). One significant drawback, however, is that the focus is almost entirely on cognitive process - the potential for other mediating and moderating processes is not considered. Arguably, it focuses too heavily on subjective perception - that stress is a psychological response (Grant et al., 2006).

The transactional model has been described as “conceptually unclear and empirically problematic” (Grant et al., 2003 p.450), largely because it confounds stress with a mediating process (appraisal). Since the transactional theory was first proposed, a large and increasingly sophisticated literature has developed in relation to a variety of mediating and moderating mechanisms in the stress response process. It has been argued that stressors and processes should be defined separately from one another in order to

facilitate a comprehensive investigation of how stressful experiences contribute to the development of psychopathology (in children and adults). This is particularly salient for research on child and adolescents, as Grant explains “the role of specific mediating and moderating processes is likely to shift across development” (Grant et al., 2011 p.360). For example, studies have shown that stressors can impact on outcomes in young infant children - links that occur before cognitive capacity is fully developed (more on this in *Chapter Four*) and therefore suggests that other mediating mechanisms must be in operation.

## **2.5 BIOLOGICAL PERSPECTIVES**

The biological sciences have long studied stress. In contrast to the life events and transactional approach, their focus has been on the internal and hormonal changes that mediate the impact of environmental stimuli on physical health. The focus is on biological, chemical and physical features of stress.

According to this approach, stress is conceptualised as an “internal reaction to a situation, rather than the situation itself (stressor)” (Clow, 2001). Although several specialised sub-disciplines have emerged (such as psychophysiology and psychoneuroendocrinology) it is widely accepted across these disciplines that adjustment to external challenges through internal changes is the mechanism through which organisms interface with their environment (Gunnar and Quevedo, 2007). Physiological stress research therefore focuses on the biological systems that become activated in response to psychological, physical and social stressors.

Biological researchers have identified several mediators of the stressor-outcome relationship (Hjortskov et al., 2004; Karatsoreos and McEwen, 2011; Koolhaas et al., 2011). The basic mechanics of the biological stress response comprise the perception of harm or threat leading the brain to stimulate the increased production of a range of stress hormones that in turn affect cardiovascular, neuroendocrine and immunological functioning and prepare the body for ‘fight or flight’ (Fulford and Harbuz, 2005). A wide range of neurotransmitters, hormones and regulatory systems have been implicated in the stress response, but considerable efforts have been made to understand two systems in particular: the sympathetic-adrenal-medullary axis (SAM) and the hypothalamic-

pituitary-adrenocortical axis (HPAA) (Allwood et al., 2011; Koolhaas et al., 2011). The latter is the focus of this PhD<sup>2</sup>.

The HPAA can be described as a cascade of hormones (Jessop and Turner-Cobb, 2008). Very simply put, when stimulated a region of the brain called the hypothalamus secretes a hormone (Corticotrophin-Releasing Hormone; CRH) that in turn stimulates the pituitary gland to secrete another hormone (adrenocorticotrophic hormone; ACTH) that in turn causes the adrenal glands to produce the stress hormone cortisol. Cortisol, the end product of the cascade, influences many different physiological systems, such as cardiovascular function and blood sugar levels as well as the immune system, digestion and fat, protein and carbohydrate metabolism (Kemeny, 2003). The HPAA helps sustain homeostasis and under normal conditions maintains a circadian rhythm that is essential to life. However, the perception of an external stressor or threat will trigger the HPAA to produce more cortisol than usual in order to mobilise extra physical resources that support adaptation to the demands of the environment (Gaab et al., 2003; Guttman and Numeroff, 2011). Cortisol has become a popular biomarker of stress in biological studies and is increasingly measured in psychosocial stress research, this is largely because it can be collected and measured relatively easily through non-invasive saliva sampling (Jessop and Turner-Cobb, 2008; Pollard and Ice, 2007).

Reviews of biological stress research reveal a large body of evidence to support the notion that environmental stressors can effectively ‘get under the skin’, influencing children’s brain and physical development (Bremner, 1999; Chida and Steptoe, 2009; Gunnar and Quevedo, 2007; Hellhammer and Hellhammer, 2008; Kemeny, 2003; Levine, 2000). It is now known, for example, that acute life stress in the early years such as that afforded by maternal deprivation can have profound effects on the way that children’s brains are wired, with knock-on consequences for many dimensions of their development (Essex et al., 2011; Gunnar et al., 2008; Gustafsson et al., 2010).

One criticism is that the biological approach tends to account for individual variation in response to stress in terms of biological factors (Cohen et al., 1997b). Studies show that

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<sup>2</sup> The SAM largely operates outside of the realms of conscious control and it’s measurement requires highly obtrusive methods (Blascovich and Kesley, 1990; Burg and Pickering, 2011; Granger et al., 2006).

individuals differ in their physiological responses to stressors and the same stimulus can induce a stress response in one person but not another (Cohen and Hamrick, 2003). The size of that response can vary also. Researchers from the biological tradition largely focus on the physiological factors that account for variation, such as gender, age, pubertal status, weight and BMI (Dallman and Hellhammer, 2011; Kudielka et al., 2009). Furthermore, as Evans et al. (2013) points out “the majority of the literature concerning physiological stress determinants has focused on adults. In children and adolescents, very little is known about which covariates should be taken into account, despite a myriad of studies investigating physiological stress as a vulnerability factor for disorders in childhood and adolescence” (p.2).

There is widespread acknowledgement amongst physiological researchers that stress responses are also influenced and to a large extent *elicited* by psychological processes such as perception and appraisal (Katz, 2001), statements such as “stress reactivity is better understood as the intertwining of biological and psychological processes” (Gunnar and Quevedo, 2007 p.162) are common. Brain imaging studies (Ohira et al., 2008) have suggested that stress is processed through higher order brain processing, of which perception or appraisal processes are considered central. However, one of the main critiques of the biological approach to stress research is that its proponents very rarely operationalise psychological concepts, including appraisal (Roesch et al., 2002). “In many ways, a full picture of the biological stress response is only beginning to take shape, psychological antecedents, on the one hand, and the pathways through which stress promotes mental and physical health problems, on the other” (Contrada, 2011, p.7).

## **2.6 AN INTEGRATED CONCEPTUAL FRAMEWORK FOR STUDYING STRESS**

As will be described in more detail in *Chapter Three*, one of the most powerful findings spanning the entire literature is the striking individual differences in the way that children (and adults) respond to stressful experiences. While some experience deterioration in their mental health, some remain unaffected and others do remarkably well in even the harshest and most adverse circumstances (Garmezy et al., 1984; Rutter, 2013). Having briefly surveyed different theoretical perspectives within the stress literature, it is easy to see why there has been so much confusion surrounding the definition of stress. In isolation the three different traditions of stress research that have been described in this

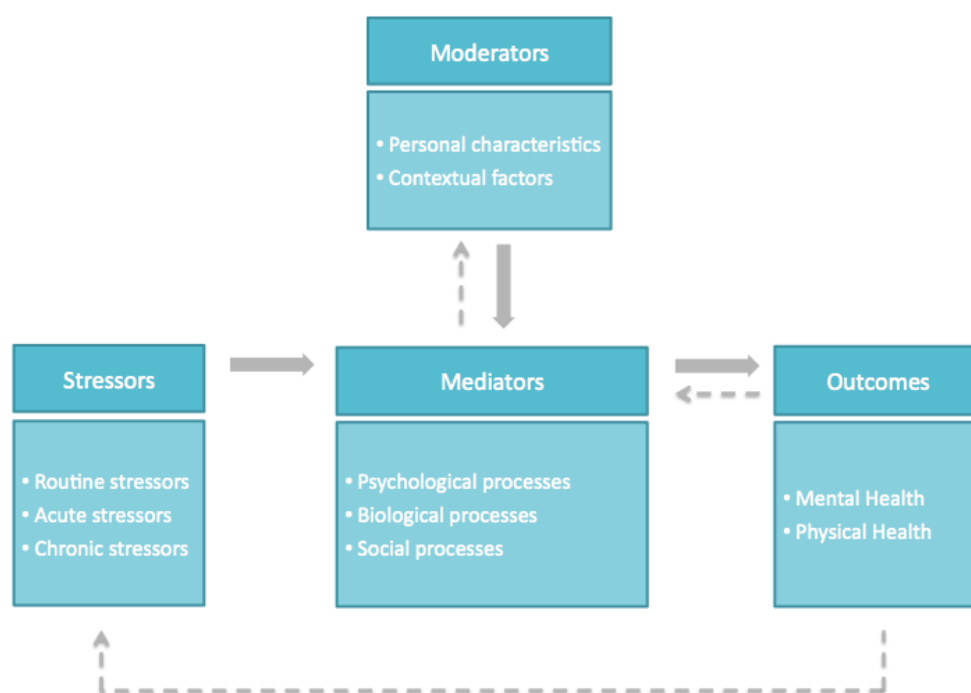
chapter (life events, psychological and physiological) are limited in the extent to which they can explain this pattern of individual differences (Cohen et al., 1997b). For example, the life events perspective focuses solely on contextual factors that promote vulnerability, frequently regards individual differences as measurement error and conceptualizes psychological processes as 'contaminants'. The psychological approach on the other hand is accused of relying too heavily on internal, subjective processes to explain variation whereas the physiological tradition of stress research is berated for ignoring important psychological differences.

The broad scope of the literature, combined with a lack of consensus around definition and the conflict between different theoretical approaches, has led some commentators to encourage the abandonment of the concept of stress altogether. Pollock (1988) for example, declared that "the term (stress) itself has become so vacuous that it represents an obstacle rather than an aid to research, and that further investigation of the relationships which stress theory attempts to elucidate would get on better without it". This is an extreme view; there are good reasons not to abandon the concept of stress.

It has been argued that a meaningful conceptualisation of stress can be constructed by integrating important elements from each of the major research traditions in this field (Contrada, 2011). Although seemingly opposing; these approaches might actually be considered as complimentary. This reflects recent theorising on the nature-nurture debate within psychology (e.g. Burt, 2008; Fairholm, 2012) and research from across the broad spectrum of human sciences revealing that individual differences can rarely be explained solely by environmental, psychological or physiological factors (Allwood et al., 2011). Therefore, multiple factors and processes (related to both environmental context and internal conditions) are likely to explain why some children are more vulnerable to the adverse effects of stressful life events than others (Luthar and Cicchetti, 2000). Glass (2011) explains that "just as complex behaviour cannot be understood in purely biological terms, mental events cannot be understood without some recourse to the relevant biological processes within the organism. And, it is true also, that relevant social environmental factors must be incorporated into any serious effort to understand behavioral and physiological outcomes" (p.xvii).

The definition of stress proposed by Cohen and described earlier in this chapter accommodates many of the different approaches, and is a framework within which researchers can most fruitfully (conceptualise and) study individual differences. It considers both the external conditions of stress and the role of subjective meaning in explaining why similar conditions have different effects on different people. There is also scope for researchers to consider processes from multiple systems, including physiological processes that underpin the biological stress response. This conceptualisation rests on a series of assumptions (Cohen, 1997b; Contrada, 2011; Grant et al., 2003) that will now be outlined and also summarised in Figure 2.

**FIGURE 2: Conceptual model of the stress process**



The first assumption is that there is a link between stressors and a range of different psychological and physical sequelae. Depending on their particular characteristics, stressors can be routine, acute or chronic (see *Chapter Two*). Stressors are generally associated with negative outcomes, hence Cohen's use of the term 'disease'. Research reviewed in *Chapter Two* generally supports this proposition but also highlights the possibility for children to experience positive outcomes following stressful experiences. Furthermore, note that in the Cohen definition emphasis is on "at risk for disease" (Cohen et al., 1997b p.3). The use of the phrase 'at risk' implies that there are individual

differences in the relationship; not every child experiences harm from stressful life events.

The second assumption is that there are response processes that influence the relationship between stressors and outcomes (as will be explored in *Chapter Four*). At the core of the modern stress literature is a distinction between psychological and biological stress response processes (Jones and Kinman, 2001). Psychological processes include cognitive appraisal and coping. Biological processes include the workings of internal systems that regulate stress hormones (such as the SAM and the HPA). Social processes are also incorporated into the model, examples include social support. All of these processes can be conceptualised as 'mediators' - mechanisms that are triggered at the point of exposure to stress that conceptually (and statistically) explain the relationship between a stressor and outcomes (Fairchild and MacKinnon, 2009; Rucker et al., 2011).

Another source of individual differences is encapsulated in the third assumption of this model; that there are risk and protective factors that influence the relationship between stressors and outcomes. Risk and protective factors can also be conceptualised as 'moderators' (Rose et al., 2004). Moderators represent individual characteristics or circumstances which usually exist prior to the occurrence of a given stressor and that exert an influence over outcomes in stressful situations (Baron and Kenny, 1986; Bennett, 2000). They act directly on stressors, processes or outcomes to increase or decrease the likelihood of poor outcomes in a stressful context. Research provides a number of different examples, such as strong parent-child bonds and IQ (Grant et al., 2006; Haine et al., 2003; Levine, 2000; Rees and Freeman, 2009).

The fourth assumption of this conceptual framework is that stressors, process and outcomes have reciprocal and dynamic relationships with each other. With regards to the direction of the relationships between these different constructs, a growing body of evidence from prospective longitudinal studies suggests that stressors activate processes that in turn lead to psychological outcomes (Carter and Garber, 2011; Dubow et al., 2006; Timmermans et al., 2010). However, there are also likely to be reciprocal relationships between the different constructs; for example children who experience emotional



difficulties might experience larger numbers of stressors and be more likely to appraise stressors as a threat.

Studies carried out by McMahon and colleagues (2003) suggest that a fifth assumption might be applied to this model - that there is specificity in the stressor-outcome relationship. The question of specificity - the unique relationship between a specific stressor and particular outcome - is an emerging area within the stress literature (Seiffge-Krenke, 2000) (McMahon et al., 2003). McMahon et al. (2003) reviewed 15 years of studies that investigated specificity and found very little evidence that particular stressors are exclusively related to either internalizing or externalizing outcomes (with exception of sexual abuse and post-traumatic-stress disorder; PTSD). Nevertheless, they argue that the lack of evidence for specificity arises from the wide variety of methods employed in studies of stressors and outcomes and propose that future studies incorporate at least two stressors and at least two outcomes.

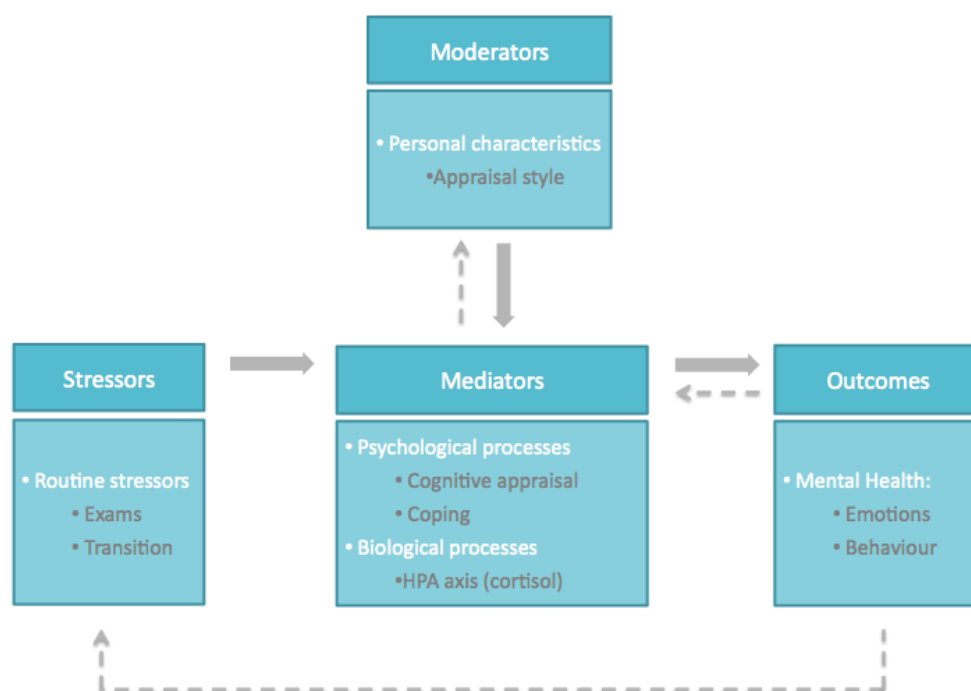
## **2.7 APPLYING THE FRAMEWORK TO THE THESIS AND EMPIRICAL STUDY**

As summarised in Figure 3, this thesis is focused on the relationship between routine stressors and children's emotions and behaviour, and furthermore it seeks to understand the role of the various stress response processes in accounting for individual differences in their emotions and behaviour. The processes in question are cognitive appraisal, coping efforts and cortisol. Throughout the thesis an emphasis is placed on the cognitive appraisal process since in the literature it is often described as the "organiser" of other stress response processes (Dallman and Hellhammer, 2011; Smith and Kirby, 2011). Of particular interest is the extent to which children might display generalised styles of appraising.

The sample for the study comprises a group of children followed-up over the course of one year in which they experience their KS2 SATs exams and the transition to secondary school. These are routine stressors that occur as the result of mandatory education policy. The resulting lack of a control or comparison group means that although prospective associations between stressors, processes and outcomes are hypothesised, the direction or causal nature of the association cannot be concluded from the findings. The study does however have something to say about specificity in the relationship

between stress and mental health, given the range of stressors (exams and transition) and outcomes (emotions and behaviour) studied. Full definitions of each of the variables under study can be found in Table 1 in *Chapter One*.

**Figure 3: Conceptual model of stress process with variables studied in thesis specified**



The thesis is in many respects multi-disciplinary. It accommodates a range of different approaches to stress, as reflected in the conceptual framework just described. Integrated approaches that give rise to studies with multilevel analyses are important and necessary because of the complexity of the stress process. They provide a more comprehensive picture of the pathways through which stress impacts on children's mental health and the causes of individual differences. With rising and troubling rates of mental health difficulties amongst UK school children, accounting for individual differences will inform the development of theoretically driven, effective policies and practices that harness the resilient capacities of those who do better in stressful circumstances for the benefit of all children (as will be explored more fully in *Chapter Nine*).

### **2.7.1 Sociological approaches to stress**

Given the multidisciplinary nature of the study it would be remiss to conclude this chapter without acknowledging the substantial contribution of *sociological* approaches to the study of stress. Social and economic factors are important variables in the experience of stressors for children and young people (Evans and English, 2002). Indeed studies have shown that such social and economic factors can influence all components of the stress response; including stressors, response processes and outcomes (Lackey, 2006).

For example, racism and ethnic discrimination have been conceptualised in the literature as chronic stressors contributing to substantial racial and ethnic disparities in psychological and physical health (Brondolo et al., 2011). They may both also be critical factors in the development of a style of cognitive appraisal that increases risk of negative outcomes in the context of stress and long-term physiological consequences (Brondolo et al., 2011).

Sociological approaches propose that a person's position in the social structure influences the stress process. The relationship between socio-economic status (SES) and stress has been the focus of much research (see Chandola and Marmot, 2011). It has been reported that children and families in lower SES groups are exposed to a much higher rate of stressors explaining, in part, the social gradient in wellbeing and mortality (DeCarlo-Santiago, et al., 2012).

Furthermore, research suggests that social *relationships* provide a buffer against the negative impact of stress on physical and psychological health (Schwarzer and Knoll, 2007; Uchino and Birmingham, 2011) through their influence over key stress response processes such as appraisal and coping. The stress literature particularly focuses on the role of constructs such as affiliation (Taylor, 2006) and also social support (Langford et al., 1997). Affiliation in the context of stress has been defined as individuals coming together to "provide and receive joint protection in threatening times" (Taylor, 2006, p.273). Social support is defined as the perceived and received functions of social relationships (Tardy, 1985; Taylor, 2011) and research shows that the benefits of perceived social support can be observed even in the absence of actual received support.

The core focus of this thesis is on cognitive appraisal and the context in which it operates and although they are not directly addressed, it is acknowledged that social factors such as ethnicity, SES, affiliation and social support as well as others not mentioned here (such as gender) are likely to be key influencers of the appraisal process. In *Chapter Eight* recommendations for further research that focuses on understanding the links between social factors and appraisal are made.

## **2.8 CONCLUSION**

There have been many references to individual differences in the stress response and it should be clear that understanding this variation is the over-arching aim of this PhD. Historically, a number of different theoretical frameworks have developed for the study of stress, such as the environmental, psychological and biological perspectives described in this chapter. However, each of these perspectives has failed to provide a comprehensive account of the causes of individual differences in children's response to stress. Thus an integrated, multi-disciplinary framework has been proposed that recognises the significance of a range of environmental, psychological, biological and social factors that influence stressors, processes and outcomes and this framework has been applied in the current study.

In the next chapter evidence will be presented for the relationship between stressors and outcomes and highlight the range of different positive and negative outcomes that children display, before describing the processes of cognitive appraisal, coping and cortisol and the potential for appraisal styles in *Chapter Four* and *Chapter Five* respectively.

## CHAPTER 3: THE RELATIONSHIP BETWEEN STRESSORS AND OUTCOMES

### 3.1 INTRODUCTION

To a large extent, empirical evidence supports the commonly held belief that exposure to stress has a harmful effect on health and well-being (Flouri and Panourgia, 2011; Seiffge-Krenke, 2000; Timmermans et al., 2010). Research on the negative impact of stress spans a broad and multi-disciplinary literature (see Fink, 2010); the key findings from reviews of stress as experienced by children and adolescents are highlighted in this chapter.

This chapter outlines the different types of stressors present in children's lives. A large proportion of the chapter focuses on *routine* stressors (those that are common, expected and experienced by the large majority of children at similar ages). These stressors have received far less attention from researchers but later in the thesis it is proposed that there are good reasons to suggest that routine stressors do provoke emotional and behavioural responses from children.

Many studies have shown that despite the overall trend, outcomes of the stress process vary at the individual level (Franklin et al., 2012; Hammen, 2009; Meyerson et al., 2011). Following exposure to a particular stressor, some children experience poorer emotions and behaviour, whereas some are unaffected and yet others experience improvements in their emotions and behaviour. This chapter presents emerging findings from research that illustrates the capacity of children to display *positive* outcomes following exposure to stress. Arguments in support of further research investigating the individual differences in children's outcomes following routine stressors are presented at the end of the chapter.

### 3.2 OUTCOMES OF THE STRESS PROCESS FOR CHILDREN

As described in *Chapter Two*, for the purposes of this study stressors are conceptualised as "environmental demands that tax or exceed the adaptive capacity of an organism" (Cohen et al., 1997 p.3). Thus the defining characteristic of a stressor is an external condition that requires coping and adaptation on the part of the individual experiencing it. The definition is broad; in some cases the individual capacity to cope might be only minimally called upon, in other instances the demands of the stressor may result in a

thorough exhaustion of coping resources (Carver, 2011). There are many human experiences that could be described as potentially stressful from losing a wallet, to moving house to the death of a close family member (Contrada, 2011, p.3).

At a basic level, stressors can be broadly divided into physical and psychosocial categories. The term *physical* stressor is applied to a variety of physical, chemical and biological sources of stress, including extreme cold, starvation, infection, electric shock, and puberty (Steckler, 1990). Conversely, *psychosocial* stressors are events or conditions of psychological or social origin (Rutter and Sandberg, 1992). They relate, for example, to conflict in social bonds and relationships as well as to exposure to novel environments. Examples include maternal deprivation, unemployment, moving house, starting a new school.

There are differences in the pathways through which humans respond to physical and psychosocial stressors (Steckler, 1990). Physical stressors are processed via well-defined biological receptor systems that serve primarily to restore bodily homeostasis. As a result humans respond to *physical* stressors in very predictable, consistent ways (Sapolsky, 2000). This is in stark contrast to psychosocial stressors that are processed via higher order brain functioning (including cognition, memory and neurobiological stress networks) that consequently give rise to a greater degree of variation in outcomes (Compas and Wagner, 1991). The focus of this thesis is on this variation, as observed in children's mental health outcomes following exposure to *psychosocial* stressors.

A number of studies document links between stressors and a variety of poor health and/or developmental outcomes (see Fink, 2010 for a comprehensive review). These range from psychological problems such as anxiety, depression and behaviour difficulties (Flouri and Panourgia, 2011; Karevold et al., 2009; Lewinsohn et al., 1994), to physical ailments such as reduced immune functioning, high blood pressure and heart disease (Barr et al., 1996; Cohen, 2002; Seiffge-Krenke, 2001b). However, research specifically focused on children and adolescents has lagged behind studies of stress in adults. In one contemporary review of the literature, Grant et al. (2003) outline a series of unanswered questions regarding the nature of the relationship between stressors and children's

health and development, and describe the field of child and adolescent stress as one in the early stages of development.

Nevertheless, there is a large body of evidence to support the notion that stressors impact on outcomes. Associations between stressors and mental health outcomes have been well documented in large-scale studies (e.g. Seery et al., 2010). For example in a retrospective cohort study of over 9000 adults, Chapman et al. (2004) report that exposure to stressors in childhood is associated with increased risk of depressive disorders in adulthood. Similarly, in a two year study of 1397 children, Berden et al. (1990) reported that higher incidence of stressful life events was associated with higher levels of parent-reported behavioural and emotional problems.

In addition to these large-scale studies, there have also been several meta-analytic and systematic reviews of the impact of stress on children's mental health. In a review of 32 studies, Compas et al. (1987) reported that a significant relationship between life events and mental health was observed in every study included in the review. Negative events were found to be related to a wide range of problems, including depression and anxiety, delinquent behaviour, suicide attempts, somatic health, and acting-out behaviour. The review also compared the findings from studies deploying two common, yet contrasting methodologies, and in doing so highlighted several limitations and promising avenues in stress research.

The first analysis comprised studies with cross-sectional designs and revealed that the frequency of stressors (or negative life events) is positively correlated with mental health problems. In other words, the greater the exposure to stress, the larger the number of symptoms experienced. Compas (1987) argues however that the extent to which these studies indicate a causal role for stressors in the development of disorder is not clear. The correlational studies yielded Pearson correlation coefficients in the range of .10 to .68. On average the studies reported modest correlations suggesting that life events account for approximately 15% of the variance in psychological symptoms. Compas (1987) argued that these correlations likely underestimate the strength of the relationship because of the diverse manner in which stress (and outcomes) had been conceptualised and measured across each of the studies reviewed. Another limitation of these studies is their

cross-sectional and largely retrospective research design. Typically, children were asked to report on past life events and corresponding psychological health at a single point in time (e.g. the previous year or six months). Compas (1987) explains “problems with the design include possible distortion and poor recollection of prior events, confounding of life event and dysfunction when measured concurrently, and failure to control for level of dysfunction prior to the occurrence of life events” (p.292).

The second analysis comprised studies focusing on the impact of a single life event (such as divorce, transition to school and birth of a sibling) on children’s psychological and physical health when compared to children that had not experienced the life event. Collectively, the findings of these studies suggest that specific stressors have a moderate relationship with psychological and behavioural distress. However and arguably more crucially, the review highlighted consistencies across the studies in relation to the resilience of some children in the face of a range of different, specific stressors. This led Compas et al. (1987) to conclude that investigating aggregate level differences between children exposed and not exposed to a stressor may be less important than researching the variables that might underpin the individual level variation in outcomes of groups of children exposed to a particular stressor.

In a subsequent review of the stress literature, Cohen and Park (1992) drew comparable conclusions. In summing the state of the evidence, they reported the dearth of studies employing standardised measures of psychological states; the frequent use of retrospective, cross-sectional study designs and the need for research that explores the factors explaining individual variation in outcomes. Cohen and Park (1992) also draw attention to the lack of evidence for the *prospective* effects of stressors that would be needed in order to establish causality in the relationship with mental health. Indeed, one of the most common recommendations for future research from a number of early reviews of the child and adolescent stress literature was the need for prospective, longitudinal studies that could reliably examine whether stressors cause symptoms (Compas, 1987; Grant and Compas, 1995; Kessler et al., 1985; Lewinsohn et al., 1994; Rutter and Sandberg, 1992).

One of the drivers for prospective studies was uncertainty surrounding the direction of the relationship between stress and mental health. It has been suggested that emotional



and behavioural problems can precipitate the occurrence of additional stressors that further exacerbate existing problems. In other words, it might be possible for symptoms of distress to predict subsequent increases in stressful events. Timmermans (2010), for example, suggests that behavioural problems are likely to provoke the onset of a number of stressors such as conflict with peers, teachers and parents, and social rejection.

Cross-sectional studies are not able to shed light on the causal relationships between variables due to confounding that may occur when stressors and outcomes are measured contemporaneously. Grant et al. (2004) explains “prospective designs can statistically control for prior levels of (psychological) symptoms and re-examine the relation between stressors and changes (increases or decreases) in symptoms over time. Prospective designs can also be used to test the temporal relations between stressors and symptoms by determining if symptoms predict later stressors, or if this relationship is bidirectional” (p.418).

Almost two decades after the first systematic reviews of the child stress literature there had been at least 60 prospective studies of the stressor-outcome relationship (Grant et al., 2004). These studies provide compelling evidence to support the argument for a causal link - that stressors cause and predict psychological outcomes in children and adolescents. Over 50 of the studies documented a significant effect of stressful life events on psychological symptoms, with stressors explaining between 1% to 21% of the variation in children’s mental health. The effects manifested in the form of a variety of different symptoms, though the associations were stronger for internalizing (emotional) than for externalizing (behavioural) outcomes. Similarly, although the pattern was evident in studies involving various different informants (i.e. parents, teachers and children), the effects were stronger in studies that utilised child self-report measures than parental reports of outcomes (Grant et al., 2004). This finding is supported by previous research by Compas et al. (2001) who found that stressors are more strongly associated with child and adolescent reports of their symptoms and psychopathology than scores obtained from parent reports.

However, it is important to note that the review does not discount the possibility of bi-directional, reciprocal relationships between stressors and outcomes in particular

circumstances. Grant et al. (2004) explain that “at least some children and adolescents are caught in a continuing cycle in which stressful experiences contribute to increases in symptoms of internalizing or externalizing problems, and these problems contribute to disrupted interpersonal relationships, failures in achievement tasks, and other types of stressors” (p. 421). Furthermore, Timmermans (2010) reports a growing evidence base to confirm that stressful events and mental health disorders influence each other.

Though significant strides have been made in the last 30 years to further our understanding of stress as experienced by children and adolescents, there remain many gaps. The reviews reported here reveal that the link between stress and negative outcomes is well documented both in cross-sectional studies and also in robust prospective, longitudinal studies, but reviewers have repeatedly called for greater exploration of the circumstances, factors and processes that explain *individual differences* in children’s response to stress (Cooper and Bright, 2001; Flouri, 2008; Kudielka et al., 2009; Masten, 2001; Rutter, 2006; Schneiderman et al., 2005). Whilst advances have been made on this issue, as will be presented in more detail in *Chapter Four* and *Chapter Five*, substantial further research is still needed.

Furthermore, studies of stress in children have tended to focus on acute and intense stressor experiences; such as abuse (Chapman et al., 2004), neglect (Beckett et al., 2006) and family conflict (Grych et al., 1992). Arguably, the emphasis on these experiences is driven by the general assumption that the larger the adjustment required by a stressor the greater the risk of serious harm to children’s health and development (Carter and Garber, 2011; Compas, 1987; Moos and Swindle Jr, 1990). While research has indeed proven that such stressors can have profound effects (Shonkoff et al., 2006), there is a pressing need to investigate the impact of more common and routine experiences, not least because it has been suggested that this particular type of stressor has an important role to play in shaping children’s development (DiCorcia and Tronick, 2011; Masten, 2001; Rice et al., 1993; Seiffge-Krenke, 2001a).

### **3.3 CLASSIFYING STRESSORS**

As described earlier in the chapter, a broad range of life experiences might be described as ‘stressors’. Children are confronted with a host of stressors, such as those within the

context of their family situation, social relationships, academic and school pressures, biological maturation, as well as societal and cultural stressors. There are a number of different ways that this myriad of stressors might be categorised (Aldwin, 2007; Kovacs et al., 2005).

Garmezy and Rutter (1983), for example, organised stressors into five categories according to their social and physical dimensions; loss (death of a parent); chronically disturbed relationships (abusive parent-child relationship); events that require social adaptation (transfer from nursery to primary school); changes in family status (divorce, birth of a sibling) and acute negative events (physical trauma). Trad and Greenblatt (1990) on the other hand proposed three categories: acute and unforeseeable (sudden and unplanned for events such as assault, natural disasters or even divorce), chronic and foreseeable (persistent disturbances such as those related to prolonged separation, low socioeconomic status and disability) and neutral stressors (events that create a feeling of pressure but that rarely produce sustained psychological symptoms, for example exams).

Although the issue of classification may seem an arbitrary one, it has significance and relevance for the idea of specificity in the stressor-outcome relationship (Contrada, 2011; McMahon et al., 2003; Stavri and Michie, 2012). If stressors can be grouped together reliably it might be possible to generalise and draw inferences about how children respond to a broader range of stressors based on specific examples. Conversely, if attempts to classify stressors prove unsound, there are limits on the extent to which findings can be generalised from studies of particular stressors (Boekaerts, 1996; Compas et al., 1988; Flouri and Kallis, 2007; Grant et al., 2011). As McMahon et al. (2003) argued “much additional work needs to be done in conceptualising and measuring stressors in a manner that captures the complexity of stressors in order to establish a meaningful examination of specificity in relation to psychological outcomes” (p.108).

In the absence of a consensus on the classification of stressors, for the purposes of this thesis a relatively broad typology has been adopted that distinguishes between routine and acute stressors (McNamara, 2000). Routine stressors are those that are common and

experienced routinely by many children at similar ages and stages of development<sup>3</sup>. Acute stressors, on the other hand, are those that are unexpected, relatively uncommon and generally not experienced simultaneously by large numbers of children. The placing of specific stressors under each of those headings will vary according to the culture and society that children inhabit (Rutter and Nikapota, 2002), for example whilst transition from nursery to school might be a typical routine stressor in England, the same may not be said for children in Papua New Guinea. The focus of this PhD is on stressors that are routine for children in mainstream schools in England.

It is important to note that it is not assumed that these classifications are mutually exclusive. Children may be exposed to one or both of these types of stressors at various points in time. Research studies have documented that acute stressors may exert some of their negative effects because they overlap with concurrent routine stressors (Compas et al., 1993).

Furthermore, it is almost certainly possible to further sub-divide these broad classifications according to the particular qualities of specific stressors, perhaps along the lines of social transitions, performance-based tasks, loss events or alternatively according to the context within which they occur such as school-based, family-based, community-based as in the Garmezy and Rutter (1983) example earlier. This level of detail has not been adopted within the confines of this thesis, but suggestions are made about the need for further work on the issue of classification in *Chapter Eight*.

### **3.4 ACUTE AND ROUTINE STRESSORS**

Acute stressors are relatively uncommon and significant life events that occur unpredictably at different points in the life course. They are generally described as sudden, unexpected, and serious (Sandberg and Rutter, 2008; Trad and Greenblatt, 1990). Acute stressors typically require prolonged periods of adjustment, are considered highly burdensome on the adaptive capacities of those experiencing them and in many cases lead to radical changes in lifestyle and personal circumstances (Rice et al., 1993;

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<sup>3</sup> Within the literature, these stressors are often referred to as normative stressors (e.g. Seiffge-Krenke, 2001a). The term normative is not a stable one and has different connotations outside of the stress literature. Thus, I have selected to use the term 'routine'. In this instance routine does not refer to repetitive action but rather the stress experienced following exposure to common, expected stressors.

Seiffge-Krenke, 2001a). Furthermore, these stressors are often theorised to have dramatic effects on outcomes, partly because the demands placed on coping capacities are large, but also because the suddenness of their onset prevents opportunities for anticipatory coping (Seiffge-Krenke, 2001b). Examples of acute stressors include sexual abuse or bereavement (Sandberg and Rutter, 2008).

The impact of acute stressors is well-documented, and indicates that exposure to this type of event can have a significant sequelae (Kessler et al., 1997; Rowlison and Felner, 1988; Sandberg and Rutter, 2008; Shonkoff et al., 2006). In a large scale study of the longitudinal course of mental health symptoms in parent-bereaved children, Cerel et al. (2006) reported that bereaved children are significantly more impaired two years following the death of their parent than children in a community control group. Other examples within the literature include studies demonstrating links between acquired disability or illness and both psychological and physical health deficits (Compas et al.) and between natural disasters and post-traumatic stress disorder symptoms (Pynoos et al., 1993).

Routine stressors on the other hand, comprise taxing changes, conditions or events that are experienced by most people at more or less the same point in the life course (Compas et al., 1993; Rice et al., 1993). They are often described as naturalistic, expected, routine and inevitable life challenges resulting in mild stress (Gore and Colten, 1991; DiCorcia et al., 2013). Seiffge-Krenke (2001a) describes these stressors as 'normative', explaining them as "events that occur at about the same time for the majority of individuals in this age group that are associated with specific developmental tasks and corresponding expectations of family, friends and society. These stressors are highly predictable, relatively frequent, and perceived as mildly stressful and controllable" (p.152). Typically, routine stressors entail changes in circumstance that require the taking on of new responsibilities or a higher level of skills (Kraag et al., 2006). Examples include starting school, moving house and the birth of a sibling. Some routine stressors originate from "fixed" social policies such as the age at which children start school and timing of examinations, other times they are connected to individual decisions based on the expectations and norms of a particular society or culture the person originates from, such

as getting married and having children (Haraldsson et al., 2010; Seiffge-Krenke et al., 2010).

Timing is an important factor distinguishing between routine and acute stressors (Rutter and Sandberg, 1992). Routine stressors are generally speaking those generally simultaneously experienced by large proportions of a given group (be it a culture, society or general population) and closely linked to developmental stage-related tasks. Whereas acute stressors are experienced by relatively smaller numbers of individual children at any one time. It is possible for variation in the timing of the onset of an event to transform what might ordinarily be considered a routine stressor into an acute one (Gore and Colten, 1991). For example, the death of a parent in old age is a common experience and considered normative (and some would argue comparatively less stressful) than the death of a parent in childhood (Black, 2008), whereas only 3% of children will experience the death of a parent before the age of 16 years (Harrington and Clark, 1998). Furthermore, particularly unusual timing of routine life events can have serious consequences for outcomes, for example, one study showed that children who physically mature earlier, particularly girls, are at increased risk of developing a negative body image and self-esteem problems (Seiffge-Krenke et al., 2010).

Within the literature, several assumptions are made within the conceptual delineation between routine and acute stressors, specifically in relation to the magnitude of the risk associated with each category. It is assumed that the larger the adjustment required by the stressor, the more sizeable the effect on mental (and physical) health. Thus acute stressors are theorised to be associated with increased chances of detrimental outcomes, whereas routine stressors are perceived to pose a relatively small threat (Obradovic, 2012; Rutter and Sandberg, 1992). Why might this be and what does the empirical evidence reveal about the impact of acute stressors?

Evidence accumulated from life events research reveals larger cross-sectional correlations between acute stressors and poor outcomes than for routine stressors (Berden et al., 1990; Fields and Prinz, 1997; Hasan and Power, 2004; Rowlison and Felner, 1988). Further support for the proposition that acute stressors have larger impact is derived from research revealing that chronic stress (the persistence of provoking or adverse conditions)

can have significant and long-lasting consequences for both physical and mental health (Sapolsky, 2000; Segerstrom and Miller, 2004). Examples of chronic stressors found in the literature include poverty (Boyce, 2006; Bradshaw, 2002), low socio-economic status (Amone-Polak et al., 2009), persistent bullying (Pellegrini and Long, 2002; Seiffge-Krenke, 2011) and inter-parental conflict (Gerard et al., 2005; Lau et al., 2007). Although, technically, chronicity could apply to both acute and routine stressors, it could be argued that many of the examples cited in the literature would be categorised as acute stressors.

These findings have generated significant interest amongst stress researchers and led to a focus on acute stressors to the relative detriment of our understanding of the impact of routine stressors. This emphasis on acute stressors is also partly driven by the potential practical implications of understanding better how acute stressors affect mental health. In the UK, many statutory and community and voluntary sector services for children are focused on 'high-risk' populations (Little et al., 2004). This is particularly the case during times of economic hardship, when resources are rationed for children experiencing significant difficulties and diverted away from prevention and early intervention services (Little and Sodha, 2013). Even in spite of economic recession, services tend to be organised for children experiencing or exposed to acute stressors (Little et al., 2003).

It has also been argued that another reason for the greater attention paid to acute stressors is explained in part by pragmatism. Where large effects are predicted researchers typically need relatively small (and therefore cheaper) samples in order to reliably (and quantitatively) investigate the relationship between stressors and outcomes (Lipsey, 1990). By contrast, routine stressors are often deemed to have mild, transitory effects resulting in the need for larger samples to detect effects.

Despite the general dismissal of routine stressors as relatively innocuous, support is building in the literature for the idea that these common experiences have a greater role in child development than previously thought (DiCorcia and Tronick 2011; Martin, 2014; Miller et al., 2013). Nikapota (2002) explains that it is sometimes assumed that if a stressor is accepted as normal within a given population, culture or society, that somehow it fails to be significant; "a moment's thought makes it clear that that is an unsafe assumption. For many years slavery was accepted as normal and acceptable in

many parts of the world but that does not mean that it had no adverse psychological consequences....child labour is still a socially accepted solution to family poverty in some societies and it constitutes a large-scale problem in many developing countries, despite the emerging evidence of the damage that may result" (p.1150).

Meyer (1951) was one of the first to argue that life events need not be catastrophic, life-changing, uncommon or non-normative to be harmful. Contemporary researchers agree, for example Ronka et al. (2003) report that when adults are asked to reflect upon the events and circumstances that had the greatest significance for them over the course of their lives, they often report routine events and not severe adversities. Similarly, when children are asked to describe the kinds of things that they find stressful, they describe routine stressors, such as feeling sick, having nothing to do and falling out with a friend. In another example, Spirito et al. (1991) demonstrated that children aged 9-14, when asked about the problems they experience on a day-to-day basis, commonly report problems with school, parents, friends and siblings. Similarly, Pincus and Friedman (2004) report that school age children commonly identify academic demands, fear of success or failure and conflicts with peers as stressful.

Despite the fact that major life events (or acute stressors) occur relatively infrequently and have only modest relationships with outcomes, rates of emotional and behavioural problems amongst children and adolescents are substantial (Collishaw et al., 2004; Meltzer, 2007). Sieffge-Krenke (1995), for example, surveyed a sample of 3000 adolescents aged 13-20 years living in several European countries and found that whilst only 2-5% of them reported recently experiencing major life events, a larger proportion - 15-20% - had developed emotional or behavioural problems. While there is a large body of evidence for a number of different mechanisms (not related to stress) that contribute to the development of such problems (Flouri, 2008; Rutter, 2002; Rutter, 2009; Southwick and Charney, 2012), there is an emerging interest within the literature about whether common and more frequently experienced routine stressors might account for more variation in children's outcomes than the infrequent acute stressors that are commonly the subject of research (DiCorcia and Tronick, 2011; DiCorcia et al., 2013; Martin, 2013; Martin, 2014; Miller et al., 2013; McNamara, 2000; Obadovic, 2012). We might conclude from these arguments, as Dohrenwend (1979) does, that despite their neglect in the



literature routine stressors are “eminently researchable” and “they are important to the people we study, the things that they are interested in and can tell us about” (p.15). The current study examines routine stress in the form of two school-based stressors: exams and transition.

#### ***3.4.1 Exams and transition: the context for this study***

During the most formative years of their development, children’s time is split between the family home and school environment. From infancy through to their teenage years, most children in the UK spend their daylight hours at school, equating to roughly 15,000 hours (Rutter et al., 1979). School is therefore a central and defining element of children’s lives; a source of a range of potential stressors and an important context for adaptation (Eccles and Lord, 1991). When children are asked about the kinds of experiences that they find stressful, they most often report school-related difficulties (Conner, 2001, 2003; Denscombe, 2000; Gallagher and Miller, 1996; Matheny, et al., 1993; Sears and Milburn, 1990). De Anda et al. (2000), for example, recorded that children often report school stressors with the most frequency compared to other types of stressors found in the home or other contexts. Similarly, Lohman and Jarvis (2000) report that the most common cause of stress identified by 100% adolescent girls and 96% adolescent boys in their study was ‘problems related to school’.

Within the space of one academic year, English children in mainstream education aged 10-11 experience Year 6 SATs exams and a few months later the transfer from primary to secondary school. These two routine stressors have been selected as the context for the empirical study in this thesis for a number of reasons. Both stressors are considered sufficiently demanding to be potentially stressful, they are both routine in the sense that they are typical experiences for children aged 10-11 in this country, and in neither circumstance is there conclusive evidence about the role of appraisal in explaining individual differences in emotions and behaviour (see Appendix I for a brief review of the literature on exams and transition). There are also a number of practical and methodological reasons for designing the study around these two particular stressors. These stressors are predictable and their timing is fixed, thus it is possible to gather data without resorting to retrospective measures that might generate inaccurate data and be subject to bias (Coughlin, 1990; Maughan, 2001; Pearson, et al., 1992). Furthermore, at

age 10-11, children have developed cognitive capacities that enable them to self-report on their own cognitive appraisals (Cicchetti and Toth, 1992; DeHart, et al., 2004).

School children all over the world take tests and sit examinations at various points during their education. Usually exams involve an assessment of performance on a subject or skill delivered via written or oral methods. In England, there are national written tests for all 11 year olds known as Standardized Assessment Tasks (or SATs). These assessments focus on English, maths and science and are taken by students on set days in mid-May, lasting less than five-and-a-half hours in total. These tests are intended to assess whether a child is working at, above or below the target level for their age. Oftentimes children's performance on these tests is also used as measures of school and teacher accountability.

School transition is a term used to describe the movement of a whole year group of pupils from one school to another and is not to be confused with annual year group transitions (Galton, 2000). The transition to secondary school, sometimes also described as the primary-secondary transfer, happens at different ages in different countries; in England, most children make a transition between primary and secondary school at age 11 (Galton et al., 2000)<sup>4</sup>. There are relatively small numbers who attend middle schools in-between primary and secondary education and some children who remain at the same school for entirety of their education (as is the case with some special schools) (Galton, 2000).

The primary-secondary transition is characterised by considerable change and discontinuity (Sirsch, 2003). Whereas the function of primary school is to facilitate the acquisition of basic skills of literacy and numeracy to young children, secondary schooling was designed to provide a broad curriculum across a range of subjects in order to impart knowledge and conceptual understanding to pupils (Seidman et al., 1994). Children can expect to move from the known to the unknown, from a smaller primary school to a larger secondary school, from having a single teacher for several subjects, to a different teacher for each subject, usually in a different classroom (Cadwallader et al., 2003).

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<sup>4</sup> The structure of education systems differs according to the country that children live in. For example in Ireland and Scotland children make the transition to secondary at age 12. In the US there is a great deal of variation in educational phasing, with some children transferring to middle schools aged 9 or 10 whereas others transfer to junior high schools aged 10 or 11.

### **3.5 WHAT DO WE KNOW ABOUT THE IMPACT OF ROUTINE STRESS?**

Although relatively few studies have considered the impact of routine stressors, compared to acute ones, the subject has not been entirely ignored (Ryan-Wenger et al., 2000).

For example, a number of studies have documented an age-related trend towards increased psychological symptoms coinciding with the occurrence of several routine stressors experienced during the transition from middle childhood to adolescence (Grant et al., 2011; Hagell, 2012; Romeo, 2010; Rutter et al., 2006a; Timmermans et al., 2010). Although many young people manage the transition successfully, there are several accounts of an increase in emotional and behavioural disorders in the early teen years. Whilst this trend is frequently observed, a direct causal link to the routine stressors commonly experienced during this developmental stage is yet to be established (McNamara, 2000).

Nevertheless, a series of studies conducted by Seiffge-Krenke (1995) clearly document an association between routine stressors and psychological outcomes. Involving large samples of adolescents aged 12 to 19 years drawn from several European countries, the research examined children's responses to 64 routine stressors such as poor grades, arguments with teachers and peer problems. Analyses revealed that for the large part children perceived these stressors negatively and appraised them as threatening. These studies failed to examine direct links with developmental outcomes, nevertheless it was concluded that the more negatively children responded to these stressors the greater the risk to their psychological health. In another example, a longitudinal study of 94 adolescents and their mothers, Sieffge-Krenke (2000) reports that minor, daily stressors had a stronger relationship with psychological difficulties than acute stressors. Similar findings have been reported by Monroe and Kelly (1997), Kanner et al. (1981) and Rowlison and Felner (1988) whose research documented that 'minor' events were greater predictors of emotional and behavioural problems than significant life events (Compas and Wagner, 1991).

Rowlison and Felner (1988) reported to have provided the first empirical support for a relationship between "daily hassles" (minor stressors conceptually similar to routine

stressors) and a range of outcomes including adjustment difficulties, negative affect, physical illness, low academic achievement and absences from school. Daily hassles explained a unique proportion of the variance in outcomes even when potentially major life events experienced by the adolescents participating in the research were controlled for.

Several studies have suggested that children's physiological stress systems are also activated by routine stressors with implications for their physical health outcomes (Obradovic, 2012; Turner-Cobb, 2005). Both transition to school and transfer between primary and secondary school have been shown to evoke neuroendocrine responses in children that affect their immunity to infection (Turner-Cobb et al., 2008b; Turner-Cobb et al., 2008a). Furthermore, an extensive review conducted by Dickerson and Kemeny (2004) found that the stress hormone cortisol was particularly sensitive to routine stressors comprising performance tasks that could be negatively judged by others over other types of stressors.

These studies suggest that routine stressors can cause harm to children. Even if their impact is smaller than acute stressors, small effects can nevertheless be functionally impairing for children (Ford and Ramchandani, 2009). Population estimates from epidemiological research suggest that nearly two-thirds (60%) of adolescents report at least one symptom of depression and similar numbers (20%-59%) report having experienced prolonged periods of depressed mood (Gonzalez-Tejera et al., 2005). In one study of 11-15 year olds in the UK, the presence of a single symptom of depression was associated with problems at school and children with just one or two symptoms of depression were also significantly more likely to be impaired than those without any symptoms at all (Harrington and Clark, 1998). Isolated or minor symptoms are also known to precede the development of more severe forms of disorder. There is a great deal of evidence for example that mild depression can lead to major depressive disorder (Carter and Garber, 2011; Costello et al., 2006). Thus it is perhaps not surprising that Brent (2008) argues that the impairment burden on the population almost entirely derives from 'subsyndromal' problems and it follows that if even if the effects of routine stressors are small in terms of the harm they do to children's emotions and behaviour, they could still have significant implications for psychological development.

### 3.6 INDIVIDUAL DIFFERENCES AND THE CAPACITY FOR POSITIVE OUTCOMES

The literature presented thus far suggests that stressors in a variety of different forms cause harm to children's health and development. It is important to emphasise however, that even in the harshest conditions, the association (and size of statistical correlations) between stressors and negative outcomes is moderate at best (Compas et al., 1993). Research investigating the link between life events and children's emotions and behaviour typically reports effect sizes ranging from a small 0.2 to a modest 0.4 (Dumont and Provost, 1999; Seiffge-Krenke, 2000). The size of these associations illustrates that there is in fact wide variation in children's responses to stressors. For some children stress may produce long-lasting functional impairments across multiple domains of development; compared to mild transitory difficulties for others; and under some circumstances stress may not produce any adverse mental health effects at all (Seery et al., 2010). Increasingly however, researchers are also interested in whether it is possible for children to demonstrate positive or better outcomes as a result of the stress experience (Armeli et al., 2001; Meyerson et al., 2011; Park and Folkman, 1997). In this section of this chapter we examine these arguments in more detail, and also explore the extent to which successful adaptation to *routine* stressors might increase the chance of positive outcomes in the context of subsequent stressors.

Notions of "positive stress" can be traced back to the earliest stress researchers (i.e. Selye, 1955), and in his seminal review of the literature Compas (1987) lamented the frequency with which outcome had been operationalised (and measured) primarily in terms of dysfunction and maladjustment. Compas argued that without the inclusion of measures of *positive* mental health outcomes the field would lack a complete picture of the impact of stress.

A recent resurgence in the idea of the potentially positive effects of stress can be evidenced in the proliferation of studies on stress-related or posttraumatic growth (e.g. Kilmer and Gil-Rivas, 2010; Turner-Sack et al., 2012; Yu et al., 2010). Stress-related growth is defined as positive change experienced as a direct result of stress or trauma (Little et al., 2011; Meyerson et al., 2011). This concept emphasises the transformative possibilities of successfully dealing with stressful events and circumstances. Typically stress-related growth is manifested in openness to new opportunities, positive changes in relationships

with others, personal strength, spiritual change and appreciation of life (Tedeschi, et al., 2007).

In a review of research studies published between 2006 and 2011 investigating posttraumatic growth in children and adolescents, Meyerson et al (2011) report consistent findings in support of the links between posttraumatic growth and children's level of psychological distress, social support, religious involvement and coping. The review also suggested that posttraumatic growth decayed over time in children more quickly than has been observed in research on adults.

A related construct is resilience, and it has received considerable attention in the stress literature. It is important to note that resilience is not positive mental health *per se* rather it is the capacity of children to live well despite living in difficult circumstances (Rutter, 2006). Resilience is defined by Rutter (2012) as "reduced vulnerability to environmental risk experiences, the overcoming of a stress or adversity, or a relatively good outcome despite risk experiences... it is an interactive concept in which the presence of resilience has to be inferred from individual variations in outcome among individuals who have experienced significant major stress or adversity" (p.336). Resilience differs from stress-related or posttraumatic growth in several important ways. Typically resilience researchers measure positive adaptation in terms of a reduction in (or absence of) mental health difficulties or the successful meeting of developmental milestones, whereas growth implies improvement in pre-stressor levels of adjustment (Meyerson, 2011).

Werner and Smith (1982) were early proponents of resilience, having studied a cohort of children born on the Hawaiian island of Kauai for over 40 years they documented many examples of individuals successfully overcoming significant hardship and adversity. Theirs was one of the first longitudinal studies of a non-clinical cohort of children. Previously, researchers almost exclusively studied the causes of serious mental health problems retrospectively. As Werner and Smith (2001) highlight "the retrospective approach can create the impression that a poor developmental outcome is inevitable if an individual is exposed to perinatal trauma, poverty, parental psychopathology or chronic family discord, since it examines only the lives of the "casualties", not the lives of the "survivors" (p.2). The life-course trajectories of the children of Kauai however suggest a remarkable ability of some individuals to 'bounce-back' from adversity. Similar observations were

made by Elder (1998) in *Children of the Great Depression*, a prospective study of a cohort of children born in the US and who as adolescents experienced the Great Economic Depression of the 1930s. Some of the adolescents whose families experienced sudden financial misfortune causing them to take on additional family responsibilities coped very successfully and even seemed to be strengthened by their experiences.

As these examples illustrate, resilience is on the whole concerned with ‘bouncing back’ from significant adversity or chronic acute stress. As a consequence of this, resilience research generally focuses on acute stressors such as maltreatment (both physical and sexual), serious family discord, poverty and social disadvantage (Bonanno, 2004; Collishaw et al., 2007; Compas et al., 2012; Flouri and Kallis, 2007; Gunnar et al., 2008; Masten, 2001). Increasingly however, resilience researchers are interested in more routine stressors, due to their potential role as a ‘training ground’ for children whereby the experiences gained through exposure to these routine stressors ‘unlock’ qualities that confer resilience in the context of more serious stressors (DiCorcia and Tronick, 2011; Folkman, 2009; Graber and Brooks-Gunn, 1996; Haraldsson et al., 2010; Martin, 2014; Miller et al., 2013; Seery et al., 2010).

It is important to emphasise that resilience is not a quality in and of itself (Rutter, 2012). It is a feature of development that captures individual differences in adaptation to *specific* stressors or risk contexts (Rutter, 2013). Whilst risk and protection research is focused on factors that increase or decrease the likelihood of poor outcomes following stress, resiliency research by contrast focuses on individual variation in response to comparable experiences and therefore on causal processes (Leve et al., 2012; Rutter, 2002). In this important sense, resilience in children exposed to stress cannot truly be studied without assessing the mediating processes at the heart of the stressor-outcome relationship. As we will address in *Chapter Four*, the resilience literature has highlighted several different mechanisms - including gene-environment interactions (Rutter et al., 2006b), cognitive processes (Flouri et al., 2013; Grant et al., 2006; Mazur et al., 1999), social processes (Cohen et al., 2000; Dumont and Provost, 1999; Hennessy et al., 2009), and biological processes (Franklin et al., 2012; Seery, 2011).

One mechanism from the resilience literature has particular relevance for research on routine stressors. This mechanism has been described using various different terms (i.e. toughening, steeling), but is perhaps best known as the 'stress-inoculation hypothesis'. "Stress exposures that are not overwhelming, while still significant enough to activate emotional and physiological coping processes, may inoculate or steel the individual against later stress exposures" (Gunnar et al., 2008 p.2). Rutter (2012) draws an analogy from the medical world to further illustrate: "clearly, the best example is provided by the resistance to infections that comes about either through the acquisition of natural immunity through exposure to the infectious agents or through immunization in which induced immunity is brought about by administering a controlled dose of a modified version of the pathogen. This is undoubtedly a steeling effect." (p.338).

Dienstbier (1989) proposes that successful coping in response to routine stressors in turn leads people to appraise future stressors more positively, to be able to better cope with similar routine stressors as well as acute stressors; they become 'toughened'. He describes toughening as a form of psychological and physiological resilience and proposes that it cannot be developed if children are chronically exposed to multiple stressors, but perhaps even more significantly, toughening cannot occur if children are sheltered from stressors completely. Seery et al (2010) explain that "sheltering provides no opportunity to develop toughness and mastery and is unlikely to persist indefinitely, so when stressors are eventually encountered, individuals are likely to be ill equipped to cope with them" (p.1026).

One of the largest studies to suggest evidence of steeling (Seery et al., 2010) surveyed a nationally representative sample of 2,398 adults living in the US. The analysis revealed that adults with a history of 'some lifetime adversity' have lower levels of distress, lower functional impairment, lower symptoms of post-traumatic stress and higher levels of life satisfaction than adults who experienced either high adversity or very little adversity. Furthermore, those with a history of some lifetime adversity responded less negatively to recent adverse events than did other individuals. Another classic example comes from Stacey et al. (1970) who discovered that children who went on sleepovers or occasionally stayed with relatives (in other words those who had been exposed to short but happy



separations from their parents) were able to cope more successfully with the more complicated and multiple stresses of hospital stays.

Furthermore, Gunnar et al. (2009) found that children who had experienced *moderate* levels of early life adversity displayed lower cortisol reactivity to a laboratory based stressor than children exposed to no adversity or to chronic adversity. A further example is provided by Mortimer and Staff (2004) whose study of work stress in young adults revealed that those who had experienced work stress during their teenage years were buffered from the negative experiences displayed by individuals with little or no prior work stress - the latter group experienced low self-esteem and symptoms of depression.

Once again these studies are limited by non-experimental, cross-sectional and retrospective designs and further research is needed to determine whether these associations hold up in prospective longitudinal studies. It is also not clear what the precise mechanism of steeling is - what are the characteristics, competencies and skills that steel children against stress? In *Chapter Five* I propose that the answer to this question is, at least in part, a generalised appraisal style.

Methodological limitations and unanswered questions aside, these studies do point to a potential role for routine stressors in shaping children's mental health, but as the literature on acute stressors also documents, children experience individual differences in their response to these stressors. An important question follows about what causes some children to adapt well to stressful contexts, and others to succumb to the risks posed. What are the mechanisms that lead to successful or unsuccessful adaptation? This thesis is interested in the role of the cognitive appraisal process, coping efforts and cortisol with a primary focus on appraisal as the organiser of these stress response processes. It is also interested in the extent to which the experience of routine stressors might contribute to the development of stable, generalised *styles* of appraising stressors. Appraisal, coping and cortisol are described in greater detail in *Chapter Four* and appraisal style in *Chapter Five*.

### 3.7 CONCLUSION

This chapter presented what is currently known about the relationship between stressors and children's mental health and highlighted significant gaps in current knowledge, particularly in relation to the impact of routine stressors.

This chapter has also highlighted the large body of evidence supporting the notion that there are substantial individual differences in children's responses to a wide variety of stressors. Understanding the root causes of those differences is critical not only to advance scientific understanding of stress, but also for those seeking to shape services and policies that improve children's emotions and behaviour (Leve et al., 2012). *Chapter Four* reviews the evidence for cognitive appraisal, coping and cortisol as a cause of individual differences.

## **CHAPTER 4: THE ROLE OF COGNITIVE APPRAISAL, COPING AND CORTISOL IN EXPLAINING INDIVIDUAL DIFFERENCES**

### **4.1 INTRODUCTION**

As highlighted in *Chapter Three* there are striking individual differences in children's mental health outcomes following exposure to stress. The conceptual framework outlined in *Chapter Two* points to the role of psychological, biological and social processes and factors in accounting for individual differences. This chapter describes three specific processes in greater depth: cognitive appraisal, coping and cortisol.

### **4.2 THE SIGNIFICANCE OF COGNITION**

Within the stress literature, the causes of individual differences have been conceptualised and accounted for in a number of ways (Kudielka et al., 2009). A distinction can be made between stress response *processes*, and key risk and protective *factors* (Grant and Compas, 1995; Grant et al., 2004). In the broader child development literature this distinction might be best described as the difference between mediators and moderators (Cole and Turner, 1993).

Although a broad range of environmental, biological, social and psychological variables identified as potential mediators and moderators of stress-related outcomes, studies consistently demonstrate the importance of cognition (Carter and Garber, 2011; Chang, 2002; Chang and Sanna, 2003; Denson et al., 2009; Flouri et al., 2013). Evidence from both the adult and child stress literature suggests that the kinds of cognitions associated with increased risk of mental health problems, especially depression, in the context of stressful life experiences are low self-esteem, hopelessness, negative thoughts about the self and pessimistic expectations of the future (Robinson et al., 1995). Protective cognitions include optimism, a sense of personal control, and high self-efficacy (Grant et al., 2006; Mazur et al., 1999).

Studies of resilience have also drawn attention to cognitive skills and in particular a 'planning tendency' (Clausen, 1991; Rutter, 2012). In this instance, planning refers to a process of self-reflection on whether and how an individual is able to deal with a particular stressor coupled with a sense of agency and self-efficacy (Rutter, 2012). In a

now classic longitudinal study of girls who grew up in social care institutions due to reasons of family breakdown, Quinton and Rutter (1988) found that outcomes were significantly better for girls who felt a sense of control over what happened them and who had a planning tendency than those who did not display those 'mental features'.

The significance of the way we think for how we deal with stress is not a new idea, nor is it exclusive to psychological approaches. Nevertheless, one model is dominant within the stress literature (Flouri et al., 2013; Grant et al., 2004); the cognitive appraisal process as defined in the transactional theory of stress developed by Lazarus and Folkman (1984). This model is described in more detail in the following section of this chapter.

### **4.3 COGNITIVE APPRAISAL PROCESS**

Appraisal is broadly defined as the subjective interpretation of the meaning and significance of a particular situation or experience<sup>5</sup>. Although there are a number of different definitions of appraisal, the stress literature very frequently relies on the conceptualisation first set out in the *Transactional Theory of Stress* by Lazarus and Folkman (1984). "This theoretical framework, essentially formulated in the early 1960s, provides the scaffolding of all modern appraisal theories" (Schorr, 2001 p.23). The transactional approach emphasised that stress is produced from an interaction, or rather a transaction, between a person and their environment and that cognitive appraisal is the means by which the transaction is conducted (Lazarus, 1999). To cognitively appraise a stimulus (stressor) is to determine if it is personally relevant, to interpret its meaning and to assign some value whether positive or negative, to a situation (Folkman et al., 1986).

It is important to emphasise that in this sense appraisal is not perception. It involves a subjective evaluation of the personal significance and meaning of the stressor for the individual's own wellbeing (Kappas, 2006). According to Lazarus and Folkman (1984), "cognitive appraisal can be most readily understood as the process of categorizing an encounter, and its various facets, with respect to its significance for well-being. It is not information processing per se....Rather, it is largely evaluative, focused on meaning or significance, and takes place continuously during waking life" (p.31).

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<sup>5</sup> A note on terminology: 'appraisal' (the noun that refers to the evaluative product) and 'appraising' (referring to the act of making an appraisal) are used interchangeably".

The concept of meaning-making is central to the appraisal process (Park, 2010). It is proposed that personal meaning is created through the appraisal process and that the appraisal process in turn shapes an individual's adaptive (or maladaptive) response to a stressor. In this respect Lazarus was strongly influenced by the previous work of Grinker and Spiegel (1945). Lazarus writes that "for Grinker and Spiegel, stress and emotion had to do with personal meaning of what was happening, which in military combat, was the imminent danger of being killed or maimed. What a soldier could do to cope with this danger was severely constrained by debilitating guilt or shame about letting his buddies down, the potential accusation of cowardice for refusing voluntarily to commit to battle, and the threat of punishment." (Lazarus, 2001 p.39).

According to the transactional definition, cognitive appraisal comprises two sequentially-linked evaluative processes: primary and secondary appraisal (Lazarus, 2000; Lazarus and Folkman, 1984). Primary appraisal is an initial assessment of the significance of a situation to personally held values, goals, beliefs, commitments and intentions. It is an assessment of whether what is happening is worthy of attention and if it requires action (Lazarus, 2000; Mazur et al., 1999). Although values and beliefs are important, Lazarus considered goal commitment to be key to primary appraising. This refers to the notion that a person will "strive to attain a goal despite discouragement and adversity" (Lazarus, 2001 p.42). "If there is no goal commitment, there is nothing of adaptational importance at stake in an encounter to arouse stress. The person goes about dealing with routine matters until there is an indication that something of greater adaptational importance is taking place, which will interrupt the routine because it has more potential for harm, threat or challenge" (Lazarus, 2000 p.200).

Secondary appraisal is an assessment of what can be done to manage the demands of the stressor and the identification of any possible constraints to coping actions, based on the appraiser's own abilities and resources (Lazarus, 2000). It involves assessing what can be done about the stressor, reviewing potential coping strategies and resources, constraints against acting them out, and expectations about the outcomes of such actions (Zalewski et al., 2011). Secondary does not imply less important, and in fact the processes of primary and secondary appraisal are inter-linked (Lazarus, 2000).

The types of judgements made about a stressor as a result of the primary and secondary appraisal process can be categorised in a number of ways (Karademas and Kalantzi-Azizi, 2004; Lee-Flynn et al., 2011).

(i) 'Benign/irrelevant' appraisals occur when circumstances are deemed by the individual as innocuous or unworthy of attention. These situations require no action or adjustment and therefore they are not perceived as stressful (Bigatti et al., 2012).

There are three further types of appraisal that arise when an individual appraises a situation as in some way taxing or even exceeding their resources to cope. These are harm/loss, threat and challenge. Harm or loss appraisals are made in reference to events or circumstances that have already occurred. Threat and challenge appraisals, on the other hand are typically made before, or in anticipation of, the onset of a demanding event or set of circumstances (Smith and Kirby, 2011).

(ii) A person making a harm/loss appraisal believes some damage has already occurred either to themselves or to something or someone that is important to them (Bigatti et al., 2012).

(iii) Threat appraisals are associated with a perception of impending danger that exceeds the perceived abilities or resources an individual has to cope with the stressor (Karademas and Kalantzi-Azizi, 2004). Threatened individuals "perceive the potential for loss, with little, if anything, to be gained in the situation" (Tugade and Fredrickson, 2004, p.10) in other words they expect the experience to be negative.

(iv) Challenge appraisals on the other hand comprise a perception of impending danger that does not exceed perceived resources or ability to cope. Challenged individuals therefore "perceive the possibility of gain as well as loss in the situation" - they expect positive outcomes to follow on from the stressor (Seery, 2011). Challenge is somewhat like Selye's (1974) eustress in that "people who feel challenged pit themselves enthusiastically against obstacles, feeling expansive - even joyous - about the struggle" (p.44).

Threat and challenge appraisals are influenced heavily by secondary appraisal - differences in perceived ability and resources to cope with an impending stressor underpin the distinction between challenge and threat (Hudek-Knezevic and Kardum, 2000). Lazarus (2001) explains that “the more confident we are of our capacity to overcome dangers and obstacles, the more likely we are to be challenged rather than threatened, and vice versa, a sense of inadequacy promotes threat” (p.45).

Ennis et al. (2001) provide a helpful illustration of the distinction between threat and challenge in the context of an examination stressor: “Each individual must first determine if the stressor is personally relevant, and if so, whether it presents a potential for harm or gain. For example, a student facing an academic examination would evaluate his or her ability to deal with this stressor by considering things such as: performance on previous examinations, how regularly classes were attended, amount studied, and perceived skill in the subject material. Based on these considerations, some students may judge that the examination will exceed their abilities to perform well on it, thereby making a ‘threat appraisal’ of the stressor. Conversely, those who perceive they do have the resources to perform well in the examination are making a ‘challenge appraisal” (p. 254).

There are several defining features of the transactional approach to appraisal (these are summarised in Figure 4). First, appraisal is a mediating mechanism (Roesch et al., 2002). The appraisal process arises as a result of exposure to some form of stressor and mediates the relationship between stressors and outcomes. Theoretically speaking, differences in appraisal can account for individual differences in response to stressors. Positive forms of appraisal such as challenge are associated with positive outcomes (both mental and physical), whereas negative appraisals such as threat or harm lead to poor outcomes. In the next section of this chapter the extent to which empirical evidence supports this fundamental assumption will be explored.

**Figure 4: The six defining features of cognitive appraisal**

1. Appraisal is a mediator of the relationship between stressors and outcomes
2. Appraisals are structured into several dimensions i.e. threat and challenge
3. Appraisal is not the only mediator in the stress response process
4. There is specificity in the appraisal process that creates unique meaning
5. The appraisal process is dynamic and flexible over time
6. Appraisal can occur at both a conscious and unconscious level

Second, appraisal variables are structured into dimensions or categories such as threat and challenge and within each category is a continuum along which related outcomes might vary. It is possible for threat and challenge to occur together, but usually one is dominant over the other (Folkman et al., 1986; Jerusalem, 1990; Lazarus and Folkman, 1984; Sirsch, 2003). The correlation between challenge and threat is low, with correlations reported between  $r = -.05$  and  $r = -.06$  (Folkman et al., 1986).

Third, it is important to note that according to the transactional model, a person could only be stressed if they appraised a stressor as stressful (Lazarus, 1990b). Although the Lazarus definition of appraisal has been adopted in this thesis, this particular element of the broader ‘transactional theory of stress and coping’ is not consistent with the specific conceptual framework within which my study is situated. As noted in *Chapter Two*, stress was defined as “a process in which environmental demands tax or exceed the adaptive capacity of an organism, resulting in psychological and biological changes that may place persons at risk for disease” (Cohen et al., 1997b p.3). This definition suggests that there are a number of different psychological and physiological processes activated in the stress process (not just cognitive appraisal). Nevertheless, there are strong theoretical arguments and emerging empirical evidence (presented later in this chapter) indicating that the cognitive appraisal process is an *organiser* of other stress response processes in many contexts (Dickerson et al., 2009; Peacock et al., 1993).



Fourth, there is specificity in the person-environment transaction that creates unique meaning (McMahon et al., 2003); “each event has a meaning of its own to the individual it affects, and that meaning, as much as the players and incidents of the event itself, constitutes an important facet of the stress” (Trad and Greenblatt, 1990, p.24). Appraisals are influenced both by the particular demands of the stressor as perceived by the individual as well as the individual’s personal beliefs, commitments and coping resources (Lazarus, 1990a). Lazarus argues that personal and environmental characteristics are equally important in the transaction, though it has been argued the emphasis on the creation of unique meaning elevates the role of environment over person factors. This particular issue is discussed in greater detail in *Chapter Five* where it is argued that it might be possible for children to develop generalised appraisal *styles* that predict consistent types of appraisal across different stressors.

Fifth, the appraisal process is dynamic and flexible over time. Lazarus and Folkman (1984) emphasised that a person continually re-appraises their circumstances as an event unfolds. As the nature of their relationship with their environment changes, so too does their appraisal of the meaning and significance of the demands placed upon them (Smith and Kirby, 2011). Reappraisal continues to involve both the primary and secondary appraisal processes and thus it is possible for threat and challenge to be transformed into each other through the ongoing process of reappraisal (Lazarus, 2000).

Sixth, appraisal can be both a conscious and unconscious process (something considered in more depth in *Chapter Five*). At one level appraisal can involve complex cognitive processing such as when meaning is inferred from a stimuli and at another level it can involve more basic and automatic processing in response to the sensory properties of the stressor such as fear in the context of a loud noise (Roseman and Smith, 2001). This is a particularly important feature of appraisal that is addressed in the next chapter in relation to the development of relatively stable styles of appraising stressors that are detectable across time and contexts.

#### **4.4 COGNITIVE APPRAISAL FROM A DEVELOPMENTAL PERSPECTIVE**

This thesis focuses on the stress response as experienced by children and it is therefore important to briefly consider the appraisal process from a developmental perspective. As

stated earlier, the child and adolescent stress literature has lagged behind the comparative adult literature (Boekaerts, 1996; Grant et al., 2006) and there is a dearth of studies that focus on this particular issue of appraisal in younger populations (Miller, 2014; Steinberg, 2005; Thies and Walsh, 1999). Indeed, there is a debate in the literature concerning the validity of the appraisal concept for younger populations and many questions remain largely unanswered. For example, there is very little mention of the developmental course of the appraisal process in Lazarus and Folkman's original writings on cognitive appraisal. Indeed, Grant et al. (2004), argue that the development of cognition is not fully accounted for in the transactional theory of stress. In support of this proposition, there are research studies demonstrating that maternal separation, abuse or neglect can have harmful effects on very young children, potentially before the capacity for cognitive appraisal of these very serious stressors has been developed (Ellsworth, 2013; Nolen-Hoeksema et al., 1992; Turner and Cole, 1994). Conversely, research on appraisal in the domain of family violence suggests that children are able to perceive and detect threat in their environment in their first year of life (e.g. Hoehl and Striano, 2008; Hunniuse et al., 2011; Lobue and Deloache, 2010), though these studies applied observational methods such as eye tracking and response time rather than self-report measures.

Studies of child development confirm that many cognitive processes develop and mature over time; as children get older their cognitive capacities become more complex (Bender et al., 2011; Steinberg, 2005; Smith and Kirby, 2011). Of particular relevance is evidence that age-related changes in cognitive structures predict developmental trends in children's perceptions of themselves and the world around them (Thies and Walsh, 1999). Wyman et al. (2010) explain that several fundamental changes in 'self-cognitions' occur as children reach 7-8 years of age when they begin to view themselves and their abilities in terms of their own psychological self-understanding (enduring internal qualities i.e. stable traits and attributes) and through comparison with their peers. Prior to this shift, children's understanding of the self is influenced strongly by physical, material and active factors, such as their possessions, typical activities and bodily features (Wyman et al., 2010).

Whilst our understanding of cognitive development suggests that increasingly sophisticated appraisal structures develop as children mature (Lewis, 2001 p.205), other evidence suggests relatively stable patterns of appraisal emerge in and across adolescence. Seiffge-Krenke (1995) found that the types of stressor that 12-19 year olds appraised as threatening were the same across the teenage years. The youth participating in her international study reported ten specific normative stressors as threatening regardless of their age and nationality. Similarly Roesch and Rowley (2005) report considerable cross-situational consistency in the appraisal process over time in adolescents (more on this in the next chapter). Furthermore, in one of the last published pieces from Richard Lazarus (2000) before his death, he suggested that aside from babies and toddlers who are unable to communicate verbally, age differences in patterns of appraisal may actually be negligible.

In addition to the ambiguity surrounding the role of appraisal in explaining children's responses to stressors, another important question specifically concerns the applicability of the transactional concepts of primary and secondary appraisal (and therefore at what age can these appraisals be measured in children)? This question remains largely unanswered, although evidence is emerging from studies in the US indicating that children as young as six and seven are able to report their own appraisals in relation to stressful life experiences (Cederlund and Ost, 2011; Giannotta et al., 2012; Hasan and Power, 2004). The balance of evidence does suggest however that by the time typically developing children reach age 10 they are capable of reporting on their own appraisals of stressful life events (Reinholdt-Dunne et al., 2012; Siffert et al., 2012; Steinberg, 2005).

#### **4.5 EMPIRICAL EVIDENCE OF APPRAISAL AS A MEDIATOR BETWEEN STRESSORS AND OUTCOMES**

The general proposition that positive appraisals lead to fewer difficulties and negative appraisals to greater difficulties has an intuitive plausibility. Surprisingly however, considering the centrality of appraisal in the stress process, there are still many unanswered questions and unresolved issues. Smith and Kirby (2011) explain that much theoretical and empirical work has been directed towards the *coping* aspects of Lazarus and Folkman's model to the relative detriment of our understanding of appraisal.

There have been studies on the link between appraisal and outcomes in adult populations (Roesch, et al., 2002; Roseman, 1991; Smith and Lazarus, 1993; Weiner et al., 1982), examples include adults with HIV/AIDS (Brown and Venable, 2011), parents of children with disabilities (Trute and Hiebert-Murphy, 2002), emergency workers such as policemen (Oliver and Brough, 2002), cancer patients (Bigatti et al., 2012) and chronic pain sufferers (Ramirez-Maestre et al., 2008). Collectively, this research provides substantial evidence that appraisal is a strong predictor of adjustment in the context of many different life stresses. Negative appraisals such as threat and an inability to cope are typically associated with negative outcomes and poor adjustment, whereas positive appraisals such as challenge and perceived resources to cope are associated with good outcomes.

These and other studies of adults responding to stressors related to their work (Dewe, 1992), in military and combat contexts (McCuaig Edge and Ivey, 2012), and competitive sports (Rees and Freeman, 2009) support the importance of appraisal for outcomes in a range of different stressful contexts (Lazarus, 2000). For example, in a study designed to investigate the role of appraisal in predicting academic performance amongst undergraduate students, Schneider (2004) reported that threat appraisals were associated with negative emotions and poor performance on a verbal maths test, whereas challenge was associated with better performance.

Many of the most methodologically rigorous studies of the effects of appraisal have been conducted on HIV/AIDS patients (Roesch et al., 2002). Park et al. (1997) for example reported that perceptions of the controllability of a stressor (in this case living with HIV/AIDS) relate directly to positive psychological adjustment. Similarly, Pakenham and Rinaldis (2001) documented that men who perceive living with HIV as a challenge were more likely to demonstrate problem-focused coping strategies and report consistently better psychological outcomes than men who perceived the disease as a threat.

The transactional model of stress is frequently cited as the conceptual framework for research on stress in children and adolescents (Compas et al., 1993; De Ridder, 1997; Park, 2010; Sirsch, 2003). However, as Grant et al (2004) note “few researchers have taken seriously the cognitive appraisal component of this model, as most measures of

child and adolescent stressful experiences do not include scales that systematically assess cognitive appraisals of stressors” (p.415). Nevertheless, some efforts have been made to determine if findings from the adult stress literature can be replicated in populations of children and adolescents (Hilsman and Garber, 1995). These studies tend to focus on the relationship between threat appraisals and negative outcomes including anxiety, depression, emotional problems and poor behaviour following stressful life events. For example, in a longitudinal study of 157 children aged 8-12 years, Muris et al. (2005) investigated the prospective relationship between threat appraisals and psychological difficulties. The study revealed that threat was associated with a range of different difficulties (such as depression and aggression) though the strongest link was to symptoms of anxiety. The study is representative of a range of other studies revealing that in comparison to ‘healthy controls’, anxious children more frequently report threat appraisals in response to ambiguous situations (Muris et al., 2005). In another example, Mak et al. (2004) demonstrated that adolescents who appraise school work as threatening experience more depressive symptoms than children who appraise school work as challenging. In a 12-month prospective study of 185 children involved in road traffic or sports-related accidents Stallard et al. (1998) report that the personal meanings constructed for these stressors, through the process of appraisal, played a role in the development of PTSD. Interestingly, appraisal was a significant predictor even when the accident in question was relatively minor.

Studies investigating children’s responses to another very specific acute stressor, inter-parental conflict, provide some of the most robust evidence of the role of appraisal in the stress response process (Gerard et al., 2005; Grych, 1998; Grych et al., 2003; Grych et al., 1992; Harold et al., 2007; Shelton and Harold, 2008). Grych et al (1992) for example report that children who feel threatened and unable to cope in the context of frequently occurring marital conflict are more likely to develop anxiety problems. In another notable study, Grych et al. (2003) found that threat and self-blame appraisals fully mediate the relationship between interparental conflict and emotional problems in boys, and partially in girls. These studies figure amongst a limited number that have both conceptualised and statistically analysed appraisal as a mediator of the relationship between a stressor and outcomes.

Though in most cases studies are designed to measure threat and challenge appraisals, the emphasis in reporting is largely on the role of threat appraisals in predicting mental health problems. Few studies have examined the role of challenge appraisals as predictors of positive mental health outcomes following stressful experiences (Carver, 2011). Nevertheless, there is evidence suggest that children who make challenge appraisals experience fewer symptoms and better overall adjustment in stressful contexts. For example, Jackson and Warren (2000) suggested that positive appraisals are protective in the context of stressful life events and in the face of generally low levels of social support. In their study of 265 school-age children, those who made positive appraisals were more likely to demonstrate positive behaviours and less likely to demonstrate externalising behaviour problems in response to stressful life events.

This finding is comparable to other research (e.g. Cowen et al., 1997; Parker et al., 1990; Smith and Prior, 1995) documenting increases in adaptive behaviour following stressful events for children who perceive those events positively. As Jackson and Warren (2000) note “it may be that appraisal influences the coping resources the child implements when a major life event occurs. When a child perceives an event to be positive, this may indicate that the child feels that coping with the transition or change will require little effort and possibly produce rewards. This may lead some children to adapt well after an event seen as only mildly aversive or positive and other children to develop serious psychopathology after exposure to the same event perceived as intensely negative” (Jackson and Warren, 2000 p.1452).

Many studies of children’s appraisal, especially those investigating less acute stressors, involve providing children with a series of scenarios against which they are asked to think about how they might respond (Power and Hill, 2009). Another common approach is to employ retrospective research designs in which children are asked to reflect how they appraised *past* stressful events. In one example, Hasan and Power (2004) asked 229 school children aged 12 to 13 to answer a series of questions about appraisals they made of the most stressful events they had encountered in the past five months. The children recalled very different experiences, some referred to death or life-threatening disease in a member of their close family, others verbal conflicts with other children and others still recalled academic performance-related tasks. Regardless of the type of stressor recalled,

Hasan and Power (2004) demonstrated that negative appraisals were associated with symptoms of depression and anxiety.

In a number of studies, the type of appraisal made by children predicts not only concurrent outcomes but also subsequent or follow-up outcomes. Haines et al. (2001) report that children who perceived chronic aircraft noise as stressful experienced both impaired cognitive functioning and impaired reading ability that were sustained for at least one subsequent year. There is however, some debate about the direction of the relationship between appraisal and outcomes. In the Muris et al. (2005) study described earlier, the data did not support the researchers' expectations of prospective effects in the relationship between threat and anxiety after controlling for baseline levels of symptoms. Muris et al. (2005) thus note that it could be that threat appraisals are a by-product of symptoms, or alternatively that threat provokes and plays a role in maintaining symptoms. Whilst in some circumstances, such as for those children experiencing significant mental health problems, a bi-directional relationship between appraisal and mental health is likely, it is argued in later sections of this chapter that there are good theoretical reasons to consider appraisal as preceding any emotional and behavioural response.

#### ***4.5.1 Gaps and methodological limitations of previous research***

Although many researchers describe the transactional definition of stress as the conceptual basis of their studies, appraisal continues to be referred to as a hypothetical construct, and is rarely operationalised (Smith and Kirby, 2011; Tomaka et al., 1997). Moreover, Grant et al. (2004) suggest that the most widely used method for measuring stress in children is the self-report checklist, which would be more consistent with a life events (or environmental) conceptualisation of stress than a transactional one. There are few examples of checklists that incorporate questions that might tap into the appraisal process (Grant et al., 2011).

Monroe and Kelley (1997) proposed that "to advance theory on stress in general, and on appraisal in particular, investigators need to devote more extensive research and devise additional approaches to the measurement of appraisal (p.142). Monroe and Kelley (1997) identified the need to move beyond *ad hoc* and single-item measures that vary

from study to study towards robust, standardised questionnaires that are reliable and acceptable levels of construct validity. The authors identified the *Stress Appraisal Measure* (Peacock and Wong, 1990) as a promising measure (see *Chapter Six*). In the years that have passed, very little progress has been made on this particular issue and many of the gaps in our knowledge of how to measure appraisal reliably remain.

Furthermore, there is a general dearth of studies that make use of prospective designs to measure appraisals of stressors in real-time. Retrospective designs that require participants to recall their responses to previous stressor events are problematic for a number of reasons, not least because it is impossible to judge whether participants' self-reports reflect a later subjective reconstruction of the experience rather than an accurate account of their response as they actually experienced it (Armeli et al., 2001).

There is also a need for investigation of a wider range of potential stressors, research tends to focus on cognitive appraisal in work and academic environments, physical illnesses and chronic pain (Lazarus, 1999). It is particularly notable that very few studies have measured children's appraisals of naturally occurring stressors. The language surrounding appraisal might offer an insight into why routine stressors have so often been overlooked within the literature. Researchers often cite the following text from Lazarus and Folkman (1984) that describes psychological stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being". Smith and Kirby (2011) explain that the terms "taxing" and "exceeding" have been interpreted somewhat conservatively as meaning that stress arises from only the most extreme conditions. Furthermore "endangering well-being" implies that only negative forms of appraisal such as harm or threat are stressful and not the more positive form of challenge appraisals. As has been described elsewhere in the thesis (*Chapter Three*), interest is growing in the extent to which some children demonstrate stress-related growth, it is likely that positive challenge appraisals are an important factor in distinguishing between those who emerge from stressful experiences better or worse off than before.

Another significant gap in the literature is summed up by Smith and Kirby (2011) "beyond knowing which appraisals are associated with the experience of which emotions, it is also



important to know about how those appraisals are generated, as well as how they are related to the organization of the other (i.e. physiological, motivational and behavioral) components of the emotional response" (p.122). Discussion of which factors influence the generation of different appraisals in response to stress can be found in *Chapter Five*. The latter issue in the Smith and Kirby (2011) quote concerning the proposition that appraisal mediates outcomes through organizing other stress processes will be examined in more detail in the following section.

#### **4.6 APPRAISAL AS AN ORGANISER OF OTHER STRESS RESPONSE PROCESSES**

Despite the limitations just outlined, empirical evidence does suggest that differences in appraisal predict differences in outcomes following stress (Denson et al., 2009; Harvey et al., 2010; Park, 2010; Seery, 2011; Tomaka et al., 1993). There are important unanswered questions, however, about the reasons *why* appraisal predicts different outcomes. Research points to a range of different mechanisms connecting stressors to outcomes that span psychological, biological and social dimensions of development (Arnold, 1990; Cohen et al., 1997a; Colten and Gore, 1991; Contrada, 2011; Fields and Prinz, 1997). Two of the most commonly cited mechanisms are coping and cortisol (as a proxy for HPA functioning).

One hypothesis is that threat and challenge differentially influence the type of resources and strategies that children mobilise, both behaviourally and physiologically, to cope with the demands of the stressor (Glass, 2011; Contrada, 2011). Cognitive appraisal is theorised as a key organizer of coping and cortisol, and it has been proposed that it is through this relationship that we can explain why positive appraisals lead to positive outcomes and vice versa (Denson et al., 2009; Miller et al., 2009).

Grych and Fincham (1998) explain that "cognitive appraisal can be interpreted as an organisational construct, that is, how children make sense of and determine the personal meaning of stress should reflect how they organise experience". Their framework was developed specifically in relation to family stress such as parental conflict. They explain that a child observing parents fighting assesses the level of threat posed, attempts to understand why it is occurring and decide whether and how to respond - appraisals motivate and guide the child's response (Grych, 1998).

Just as appraisal of threat or challenge might activate coping efforts and cortisol, theoretically speaking, it could also 'switch off' these responses. Lazarus (2000) explains that appraisal is a dynamic process - a person continues to re-appraise a situation until it is no longer deemed a threat or a challenge. Thus, once a situation is appraised as benign or irrelevant, other stress response processes such as coping and cortisol are attenuated.

Moving beyond theory, an important question is whether there is evidence that links appraisal to other stress response processes in this way. Empirical research is important because the relationships between cognitive, behavioural and biological processes are likely to be complex. Indeed, many researchers issue caution, Steptoe and Vogele (1986) warn, "it cannot be assumed that autonomic and subjective reactions to experimental threats are congruent. Numerous studies indicate that subjective, behavioural and physiological stress parameters may not be treated interchangeably, and that the factors governing their reactivity may vary" (Steptoe and Vogele, 1986). Researchers have only recently begun to test models that link cognitive appraisals to coping responses and physiological reactivity in stressful contexts (Roesch et al., 2002), a summary of the key messages from that research follows over the next few pages.

#### ***4.6.1Coping***

Coping is usually defined as the cognitive and behavioural efforts individuals exert to manage the external and/or internal demands of a stressful situation (De Ridder, 1997). A range of different behaviours can be described as coping efforts. For example, getting advice, sharing feelings with another person, making a plan to solve a problem, thinking about a stressor in a different way, putting the problem out of your mind, trying to pretend that the problem did not happen, staying away from people who remind you of the problem, or being mean to someone even though they have nothing to do with the stressor (Brodinzensky et al., 1992).

A number of different classification systems have been imposed on a broad range of coping behaviours, examples include active and passive coping, and primary and secondary control coping (Compas et al., 2012). Of particular relevance for this thesis is the Lazarus and Folkman (1984) classification of coping efforts as either emotion-focused or problem-focused. Problem-focused coping refers to coping behaviours that are

intended to modify or deal directly with the stressor whereas emotion-focused coping involves attempts to regulate emotional states that arise from the stressor. This conceptualisation has been the subject of criticism and is not widely adopted in the literature (Carver, 2011; Cicognani, 2011; Zimmer-Gembeck and Skinner, 2011). It has been argued that some coping behaviours do not fit neatly into either category and others might span both. For example, Carver (2011) explains that 'seeking social support' might be enacted to both help deal with the problem and to seek comfort in relation to emotional distress, thus it is an example of both emotion-focused and problem-focused coping.

One major theme running through different typologies is a distinction between attempts to alter the stressor in hand and efforts to avoid it (Fields and Prinz, 1997; Holahan and Moos, 1987) and thus it has been proposed that coping efforts should be distinguished in terms of 'approach' and 'avoidance' (Franklin et al., 2012). Avoidance comprises activities oriented away from a stressor in order to avoid it such as not thinking about the stressor or behavioural attempts to escape the situation (Ebata and Moos, 1991). Approach strategies on the other hand, are behavioural, cognitive and emotional activities oriented toward a stressor - attempts to change the way you think about the problem, behaviour that focuses directly on the problem to solve it (Kirchner et al., 2010). The empirical study within this thesis operationalises coping in these terms.

Studies suggest that the distinction between approach and avoidance can be observed in the range of coping strategies that children enact in the context of stress, for example, in a study of 498 middle-school children (aged 11-14) Brodzinsky et al. (1992) reported that children use a range of approach and avoidant coping strategies in response to stressful life events. It would be remiss, however, to overlook developmental perspectives on coping that suggest the coping efforts children display are influenced and limited by their developmental stage and by lack of experience (Arnold, 1990; Compas and Wagner, 1991; Elias et al., 1985; Holen et al., 2012). Children are limited in their ability to actively avoid stressors and are personally and financially dependent on parents, thus aspects of children's development and their circumstances limit the types of coping they are able to adopt.

#### ***4.6.2 The relationship between appraisal and coping***

According to the transactional model of stress, the appraisal process (and in particular secondary appraisal) involves considering one's ability to cope with the presenting stressor and the extent to which resources are available to facilitate the coping process. Thus it follows that the types of appraisal that individuals make will influence the coping strategies that they enact (Frydenburg and Lewis, 2009). Clarke (2006) explains "the normative response to a situation that is within one's control is to try to directly resolve the problem. In contrast, the normative response to a stressor that is out of one's control is to avoid the problem, accept it, or otherwise attempt to adapt to the situation as it is" (p.12). Thus, positive appraisals (challenge and resources to cope) made by individuals who see something to gain from the stressor and believe that they have the resources to cope with it are more likely to utilise 'approach' coping strategies leading them to engage directly with the stressor. On the other hand, negative appraisals (threat and no resources to cope) made by individuals who perceive the potential for harm to come from the presenting stressor and who believe that they are unlikely to be able to deal with the stressor, are more likely to deploy 'avoidant' coping strategies (Bigatti et al., 2012).

Despite the centrality of the appraisal process in coping theory, empirical evidence of the extent to which children's cognitive appraisals specifically predict coping behaviours in stressful contexts is not forthcoming (Clarke, 2006). Studies have largely involved adult samples and focused mostly on stress associated with chronic ailments, such as cancer or HIV/Aids (Pakenham and Rinaldis, 2001). These studies suggest that positive appraisals, i.e. challenge, are associated with approach-oriented coping strategies. Whereas negative appraisals, such as harm/loss and threat, are associated with avoidance-oriented coping strategies. In one study for example, Franks and Roesch (2006), conducted a meta-analysis of 15 studies to investigate the relationship between appraisal and coping in adults living with cancer. They found that individuals who appraised their cancer as a challenge were more likely to use approach coping strategies, whereas those who appraise their cancer as a harm or loss were more likely to display avoidant coping strategies.

The literature on appraisal and coping in children and adolescents is less well established in comparison to the adult literature (Carver, 2011; Smith and Kirby, 2011). In many such

studies appraisal is operationalised as a hypothetical construct, with investigations focusing on the differences in coping displayed by children exposed to 'controllable' stressors compared to those experiencing 'uncontrollable' stressors (Tomaka et al., 1997). The type of stressor is used as a proxy for threat and challenge; controllable stressors as challenge, and uncontrollable stressors as threat (Clarke, 2006). Controllability is determined using objective indexes of environmental conditions, rather than measures of subjective appraisals made those confronted by the particular stressor (for the drawbacks of this approach see *Chapter Two*).

In one study Brodzinsky et al. (1992) reported that children are more likely to report using avoidant coping strategies in response to more significant life events - those that have been classified by the researchers as uncontrollable for the children experiencing them. The more controllable the stressor, the more likely the child is to display approach coping strategies. Brodzinsky et al. (1992) explain "to the extent that highly stressful events are seen as less controllable, the activation of avoidant strategies and other secondary, or emotion-focused, coping mechanisms may be quite adaptive as a way of regulating the distress associated with an otherwise uncontrollable situation" (Brodzinsky et al., 1992). Thus, assuming that controllability is linked to threat and challenge, it is implied that those making challenge appraisals are more likely to adopt approach coping and those making threat appraisals are more likely to engage in avoidance.

There are some examples of studies on young adults that operationalise the concept of appraisal in more subjective terms. For example, in a study of 211 African American undergraduate students it was reported that appraisals (and dispositional traits) are predictive of the use of specific coping strategies in response to stressful situations (Smith and Dust, 2006). The degree to which participants viewed the situation as desirable and as a challenge was associated with greater use of cognitive coping strategies such as "I am learning something from the experience" or "I am making a plan of action". Appraising the stressor as a challenge was also predictive of the greater use of 'behavioural coping strategies' such as "I am asking people for advice about what to do" or "I am letting my feelings out". Young adults who perceived the potential impact of the stressor as low were less likely to report avoidant coping strategies such as denial, whereas those who both perceived the potential impact to be high and believed the

stressor had a good chance of occurring were more likely to engage in denial as a way of coping (Smith and Dust, 2006).

Similarly, in a study of pre-adolescents conducted by Zalewski et al. (2011) appraisal was measured via self-report questionnaires that assessed threat, challenge and resources to cope in the context of children's self-identified three "biggest problems". The study findings indicated that children who reported higher levels of positive appraisals such as challenge and resources to cope were more likely to report active coping styles, whereas those who reported higher levels of threat appraisals were more likely to describe using passive coping styles.

The emerging evidence in support for the relationship between appraisal and coping has for the most part been obtained from cross-sectional studies (Armeli et al., 2001). This means that the direction of the relationship between appraisal and coping is not clear, and the extent to which appraisal *organises* coping is not yet known (Olff et al., 2005).

#### ***4.6.3 The relationship between coping and mental health***

Both approach and avoidant coping might be considered adaptive, depending on the specific stressor or context. Generally speaking however, approach strategies are associated with better psychological functioning and adjustment than avoidant ones (Frydenberg and Lewis, 2009). With regards to avoidant coping strategies, Ebata and Moos (1991) explain that "avoidant coping may initially reduce anxiety and prevent the problem from becoming overwhelming or crippling. But the danger of avoidance coping is that it may prevent or interfere with appropriate adaptive action. Even in the face of uncontrollable events, the reduction of anxiety by avoidance may not be productive if it prevents psychological resolution of the problem" (p.51). For many stressors, the longer it is avoided, the more difficult and urgent the problem becomes and in extreme cases avoidant strategies can lead to excessive use of alcohol or drugs (Carver, 2011).

Qualitative reviews (e.g. Grych and Fincham, 1997; Fields and Prinz, 1997) of the literature on stress and coping in youth support the proposition that coping strategies falling under the heading of 'approach' are associated with healthy functioning whereas avoidant strategies are associated with emotional and behavioural difficulties. Compas et

al. (2001) for example report that approach strategies are associated with fewer emotional difficulties in 29 of 40 studies and fewer behaviour problems in 15 of 18 studies. These findings are similar to those reported by Ebata and Moos (1991) Compas et al (1988) and Zalewski et al., (2011).

Holen et al. (2012) note that many studies investigating the relationship between coping and mental health in children are conducted on samples of children or adolescents experiencing chronic physical illnesses such as diabetes and cancer, or serious psychological difficulties such as depression and anxiety. There are relatively few studies that examine the coping strategies of 'healthy' children in the context of routine stressors (Seiffge-Krenke, 1993). Research involving the aforementioned clinical samples reveals that children with diagnosed psychological disorders more frequently employ avoidant coping techniques than healthy controls (Seiffge-Krenke, 2001) who conversely tend to display positive and adaptive ways of coping with stressors (Seiffge-Krenke, 2000).

It has also been noted that trends in the relationship between coping and psychological outcomes has not been conclusively proven. Clarke (2006) conducted a meta-analysis on 40 studies of the relationship between approach coping (referred to as active coping) and children's mental health outcomes in the context of interpersonal stressors. The meta-analysis revealed that the main effect for the relationship between approach coping and mental health is positive but relatively modest in size. Approach coping accounted for less than 2% of the variance in a range of mental health outcomes including behaviour, social competence and academic performance. These findings are also apparent in empirical research on coping in adults (Bigatti et al., 2012; Clarke, 2006). For example, in a meta-analysis of 34 studies of coping in adults, Penley et al. (2002) report that although coping is reliably associated with psychological health, the "stability, direction and strength of the associations" vary across specific strategies. Overall, the correlation between coping and psychological health is small to modest.

The majority of research on coping in children and adolescents involves cross-sectional research designs and are therefore unable to determine causality (Clarke, 2006; Compas et al., 2001). However, evidence for a causal link between avoidant coping and poor psychological adjustment has been established in a small number of longitudinal studies

(Seiffge-Krenke, 2000). These studies show that avoidant copers display a higher number of the symptoms of depression than approach copers. Furthermore, children who increasingly use more avoidant coping strategies over time, experience progressive deterioration in their outcomes, whereas those who display greater use of active coping strategies over time experience longitudinal improvements in their outcomes (Seiffge-Krenke and Klessinger, 2000).

Having explored the relationship between cognitive appraisal and coping in the context of children's response to stressful experiences, the next section focuses on the relationship between cognitive appraisal and the stress hormone cortisol.

#### **4.6.4 Cortisol**

The body has a highly complex *biological* response system for dealing with stress. Following exposure to a stressor a number of physiological alterations occur that support adaptive behaviour in the context of the demanding or challenging situation (Segerstrom and Miller, 2004). As described in *Chapter Two*, those alterations are activated by two inter-related physiological stress networks, the most widely studied of these networks is the hypothalamic-pituitary-adrenal axis (HPAA) (Guttman and Numeroff, 2011; Kemeny, 2003). The HPAA is often described as a 'cascade of hormones'; when stimulated, an area of the brain known as the hypothalamus secretes a number of hormones that in turn cause the adrenal glands to produce cortisol (Steckler, 1990). Cortisol influences many different physiological systems, such as cardiovascular function and blood sugar levels as well as the immune system, digestion and fat, protein and carbohydrate metabolism (Sapolsky, 2000).

The HPAA operates under basal or resting conditions to promote homeostasis in a circadian rhythm that is essential to life (Herbert et al., 2006) and plays an important part in synchronising bodily functions around the 24-hour light/dark cycle (Clow, 2004). However, exposure to a stressor stimulates the HPA to produce *elevated* levels of cortisol. As Ruttle et al. (2011) note, "the HPA axis is a regulatory system therefore it modulates the amount of cortisol released to achieve a favorable physiological state" (p.124). As noted in *Chapter Two*, the increase in cortisol is intended to mobilise physical resources that support adaptation to the particular demands of the stressful environment or



adverse conditions such as bursts of energy, increased immunity and lower sensitivity to pain (Gaab et al., 2003). Researchers have reported finding elevated levels of cortisol in children following exposure to a range of stressors, both in laboratory-based experiments and under naturalistic conditions (Slattery et al., 2013; Turner-Cobb et al., 2008a; Turner-Cobb et al., 2008b). Though it is worth noting that there are relatively fewer examples of studies that investigate children's cortisol responses to naturalistic routine stressors (Kelly et al., 2008; Lopez-Duran et al., 2009a). As will be described below, cortisol responsivity is strongly linked to emotional and behavioural difficulties.

#### ***4.6.5 The relationship between appraisal and cortisol***

Many cognitive processes have biological correlates including strong links to the neuroendocrine system and the HPAA (Seery, 2011). Researchers widely acknowledge that for the HPAA to be activated (over and above basal functioning), there must be some *perception* of an external challenge or threat (Gaab et al., 2005). Despite this, empirical evidence that different types of cognitive appraisal produce differences in the regulation of the HPA axis and associated cortisol levels is not conclusive (Harvey et al., 2010; Lovallo, 2011). For example, in a review of the moderating and intervening variables that influence cortisol responses to stressors, Kudielka et al. (2009) compared the evidence for age, gender, sex hormones and smoking. Their discussion of the role of appraisal, described as an "acute subjective-psychological stress response" suggested "inconsistent and largely inconclusive results" (p.9). Similarly, a review of the determinants of physiological reactivity to stress in children and adolescents conducted by Evans et al. (2013) failed to consider the role of appraisal or cognitive processes more generally.

Indeed, many studies fail to find a robust association between psychological and physiological responses to stress (Balodis et al., 2010; Hjortskov et al., 2004; Knorr et al., 2010). Nicolson (2008) explains "although an individual's appraisal of the stressor, coping and degree of distress are predicted on the basis of transactional stress theory to moderate or mediate the cortisol response, laboratory studies have shown surprisingly low correlations between individual self-reports of these variables of cortisol measures" (p.42). Possible reasons for this include design limitations such as a time-lag between the application of psychological and physiological measures, the absence of a self-report questionnaires with robust construct validity with which to measure appraisal. Reviewers

have also suggested that variation in study design and cortisol sampling methods in particular render it difficult to draw conclusions about the relationship between appraisal and cortisol (Hjortskov et al., 2004). It has been suggested that longitudinal studies deploying multiple measures at different time points are needed to explore the link more fully (Balodis et al., 2010).

Despite these observations, an empirical literature supporting the link between appraisal and cortisol is growing. A review by Dickerson and Kemeny (2004) is widely cited (see Slattery et al., 2013). Their review of numerous experiments designed to provoke increased cortisol production amongst participants concluded that stressors characterised by high levels of perceived social-evaluative threat (potential to be judged negatively by others) and low levels of control provoked the largest cortisol response (Gunnar et al., 2009). However, a significant limitation of the analysis is that stressor conditions across all of the studies included have been operationalised as a proxy measure of different types of appraisal - and thus an assumption is made that there are few individual differences in the manner in which individuals appraise equivalent stressors.

Similar methodological limitations can be applied to a meta-analysis of 80 studies of cortisol responses to stress conducted by Denson et al. (2009). Their analysis focused on studies of cortisol response in the context of laboratory stressors that resemble routine, naturalistic stressors such as watching a sad movie, a public speaking task, and interpersonal conflict. Whilst the analyses indicated a relationship between appraisal and cortisol, the reviewers employed “high inference coding procedures” to assign each stressor a type of appraisal based on the reviewer’s subjective views of how the majority of participants in each study were likely to have responded. Again, a proxy retrospective measure of appraisal has been constructed for each stressor and little consideration has been made of individual differences.

A series of studies conducted by Tomaka and Blascovich (Tomaka et al., 1993; Tomaka et al., 1997) reveal a correlational link between appraisals and physiological activity. The studies were designed to experimentally manipulate the types of appraisal that participants make in response to a laboratory stressor. Blascovich et al (2003) explains their approach “our strategy has been to design experiments that, for the most part,

manipulate one critical feature of either the demand or the resource components of appraisal" (p.239). Their studies reveal that threat appraisals lead to a threat response that consists of high negative affect and disrupted physiological functioning. Challenge appraisals lead to a challenge response comprising positive affect, and "efficient or organised mobilization of physiological resources" (Blascovich, et al., 2003, p.64). The studies also provide evidence of the direction of the relationship between appraisal and cortisol. Through altering the way a stressful task is presented (emphasising either threat or challenge) different appraisals can be stimulated, which in turn differentially impacted on physiology.

Thus, it has been proposed that threat appraisals are associated with greater levels of anxiety, distress and increased levels of cortisol (suggesting increased activity of the HPAA). Whereas challenge leads to less anxiety and minimal activation of the HPAA (Ennis et al., 2001). In a small study of 58 undergraduate students, Ennis et al (2001) reported that threat appraisals in response to impending academic examinations are associated with greater levels of anxiety and distress as well as significantly elevated levels of cortisol reactivity. This is in contrast to subjects who appraised their exams as a challenge - their levels of anxiety were much lower and cortisol was not elevated to the degree experienced by those who produced threat appraisals.

It is worth noting that support for the link between appraisal and cortisol has also been boosted by significant advances in brain imaging techniques that have enabled investigators to demonstrate that regions of the brain known to be involved in cognitive processing (including appraisal) are linked directly to the HPAA (Gaab et al., 2003). However, the relationship between appraisal and cortisol may not be as simple as these studies reported thus far suggest. For example, Gaab et al. (2005) suggested that threat (as a product of the primary appraisal process) is associated with cortisol reactivity, whereas perceptions of resources to cope (secondary appraisal) is not related to cortisol. In their study of adult males, primary appraisal explained up to 35% of the variance in cortisol scores but secondary appraisal had no predictive power. However, in a study of 70 adolescents, Slattery et al. (2012) report that secondary appraisal (perceived controllability and ability to cope) is predictive of cortisol reactivity whereas primary appraisal (threat and challenge) is not.

In summary, evidence for the connection between mind and brain remains both rudimentary (Rutter, 2012) and contradictory. One explanation for the inconsistent empirical evidence for this supposition may be the existence of specificity in the stress process (see *Chapter Two*) either in relation to the type of appraisal needed to activate physiological processes, or the specific aspect of the physiological stress response that is activated. There are clear theoretical reasons to suppose that appraisal is critical for the activation of physiological stress responses (Gaab, et al., 2005) but the contradictory findings reported here suggest that the relationship is complex and there is a pressing need for more research on the link between appraisal and cortisol.

#### ***4.6.6 The relationship between cortisol and mental health***

Evidence suggests that elevated levels of cortisol, particularly over a prolonged period, has serious negative consequences for *physical* health (Abela and Sullivan, 2003; Bruce et al., 2002; Knutsson et al., 1997). Physical effects can include decreased immune function increased susceptibility to a variety of illnesses from the common cold to cardiovascular disease. Harvey et al. (2010) further notes that individuals who demonstrate elevated cortisol in stressful situations are likely to experience impaired performance in areas of memory, decision-making and attention. Longitudinal studies indicate that elevated cortisol can also have permanent effects on the structure and function of the brain. Megan Gunnar for example demonstrated that many children who experienced prolonged exposure to elevated levels of cortisol during critical periods of early brain development display permanently increased HPAA activation in later life (Essex et al., 2011; Gustafsson et al., 2010; Tyrka et al., 2012). Just as too much cortisol is deemed harmful to health, too little cortisol is also associated with poor physical health outcomes. Research has documented that chronic over-activation of the HPAA can eventually desensitise individuals to stressful situations and lead to the development of an unresponsive (technically known as hypoactive) HPAA (Fries et al., 2009).

In addition to physical health problems, a body of literature has also demonstrated that dysfunctioning of the HPAA is associated with *psychological* difficulties (Lopez-Duran et al., 2009a) such as obsessive compulsive disorder (e.g. Kluge et al., 2006), interpersonal problems (e.g. Reinhard, 2012) and PTSD (e.g. Yehuda, 2006). This thesis is primarily concerned with emotional and behavioural difficulties and studies have revealed links

between both of these difficulties and dysregulated cortisol levels in children and adolescents, though they are more commonly referred to as internalising and externalising behaviours respectively (Ruttle et al., 2011).

There have been several studies of the relationship between cortisol and depression as one example of an emotional (or internalising problem). However, the picture provided by the literature is mixed. Some cross-sectional studies report that *lower levels* of cortisol are associated with depression (De Bellis 1996; Granger et al., 1998), whereas other studies found *elevated* levels of cortisol to be associated with depression (Levine et al., 2007; Tyrka et al., 2010). Lopez-Duran et al. (2009b) reports that research on HPAA functioning and depression in children varies in the extent to which the former are measured and tested, leading to mixed findings and no clear consensus on the nature of the link. Lopez-Duran et al. separated out the studies and conducted meta-analyses on the findings from the different approaches, and concluded that the weight of evidence supports the notion that depressed children experience dysregulated HPAA functioning, in the form of higher baseline cortisol values, and overactive responses to psychological stressors.

Longitudinal evidence for the relationship between cortisol and emotional difficulties in children and adolescents further supports the proposition that elevated cortisol is linked to internalising difficulties, and indeed reveals the nature of the direction of the relationship (Abela and Sullivan, 2003; Ruttle et al., 2011; Tyrka et al., 2010; Tyrka et al., 2012; Vreeburg SA et al., 2009). For example Smider et al. (2002) reported that higher levels of cortisol in the afternoon predicted the onset of greater emotional difficulties amongst 4 year old boys in Kindergarten, after controlling for baseline levels. In a study of older adolescents at risk for mental health difficulties, elevated levels of cortisol obtained in morning measurements predicted the onset of a major depressive episode in the following 12 months (Goodyer, et al., 2000). Similarly, Halligan et al. (2007) demonstrated in a three year longitudinal study that elevated morning saliva cortisol at 13 years of age predicted depressive symptoms at 16 years of age, even after controlling for baseline levels of such symptoms.

Research also reveals an association between dysregulated cortisol profiles and *behaviour* problems (Alink et al., 2008). Once again, the evidence is somewhat contradictory. There are some studies that report positive or indeed null associations between behaviour problems and cortisol (Azar et al., 2004; van Bokhoven et al., 2005; Fairchild et al., 2008; Gerra et al., 1997; McBurnett et al., 2005), whereas in a review of the literature Ruttle et al. (2011) reported that evidence points to a negative association, with lower levels of basal cortisol associated with greater externalising difficulties. One explanation for these mixed findings is that the HPAA is adapting in response to long-term exposure elevated levels of cortisol (Fries et al., 2005). Ruttle et al. (2011) explain “the HPA axis is a regulatory system; therefore, it modulates the amount of cortisol released to achieve a favourable physiological state...recent exposure to a severe stressor may initially result in elevated cortisol...after extended exposure to severe stress, the HPA axis develops a counter-regulatory response whereby cortisol rebounds below normal” (p.124). This finding is particularly significant because it suggests bi-directional relationships over time between outcomes (in this instance behaviour problems) and mediational stress response processes (cortisol). Finding that stress can lead to behaviour problems and that in turn behaviour problems can significantly alter the functioning of the HPAA opens up the possibility that appraisal and coping processes might also be affected.

Furthermore and as was described in *Chapter Three*, positive mental health is a relatively new concept in the literature and perhaps unsurprisingly there is an absence of robust measures of this dimension of psychological functioning. Nevertheless evidence is emerging to suggest that positive mental health is associated with lower overall levels of cortisol and faster recovery to normal patterns (Lindfors and Lundberg, 2002). For example in a study of 99 breast cancer patients, Diaza et al. (2014) found that posttraumatic growth was observed to a greater degree in individuals who had a normal diurnal cortisol pattern. Studies of the relationship between positive outcome following stress and cortisol in children are needed.

Thus, on balance, research evidence suggests that behaviour problems (externalizing behaviours) are associated with lower cortisol levels and emotional problems (internalizing behaviours) with high cortisol. However, due to the co-morbidity of internalising and externalizing the relationship is likely to be more complex than this

simple dichotomy suggests and this may explain some of the contradictory findings in the literature (Allwood et al., 2011; Tyrka et al., 2012). It is also noteworthy that studies vary in the specific measure of cortisol utilised. There is an increasing debate within the literature regarding one specific measure of cortisol secretion - the cortisol awakening response (CAR) that occurs between the moment of waking up in the morning and 45 minutes post-awakening (see *Chapter Six* for further detail on the CAR). It has been proposed that it may have unique relationship with psychological outcomes. Following a review of the literature Chida (2009) finds that depression has been linked with both an increased CAR and reduced CAR. Furthermore, whilst an elevated CAR has been linked to work stress, general life stress and depression, a decreased CAR has been linked to PTSD, fatigue, burnout and exhaustion as well as to positive affect, happiness, optimism (Chida and Steptoe, 2009; Steptoe, 2007).

Whilst studies increasingly provide evidence of a link between cortisol and mental health, the precise mechanism through which these two variables are related to each other is less clear.

#### **4.7 CONCLUSION**

This chapter described the cognitive appraisal process and how it might operate to explain individual variation that arises in children's mental health outcomes when exposed to a stressor. There is a small but promising body of evidence to suggest that children who make challenge appraisals experience fewer difficulties than children who make threat appraisals in stressful contexts.

It was established in *Chapter Two* that multiple stress response processes exist, and so connections between appraisal, coping and cortisol have been explored in this chapter. Theory suggests that appraisal acts in an organising role, with challenge appraisals leading to more adaptive coping efforts and healthy cortisol levels than threat appraisals. This is one important way in which we might explain exactly how and why the appraisal process is likely to be a good predictor of emotional and behavioural outcomes following stress.

However, it is also clear that there are significant gaps in the empirical evidence to support these theories. There is a dearth of data on the role of appraisal in children's

responses to naturally occurring, routine stressors and in particular it's role as an organiser of coping and cortisol. The empirical study at the heart of this thesis attempts to address some of these gaps, as is outlined in *Chapter Six*.



## CHAPTER 5: APPRAISAL STYLE

### 5.1 INTRODUCTION

In *Chapter Three* evidence was presented of the striking individual differences in children's responses to stress. In response to equivalent stressors some children experience worse emotional and behavioural difficulties, others remain unaffected and some children might be described as experiencing better emotions and behaviour (Schneiderman et al., 2005). An argument was made in *Chapter Four* in support of the cognitive appraisal process as a key stress response mechanism with potential to explain this pattern of individual differences: the cognitive appraisal process is activated on exposure to a stressor, and the resulting appraisals influence the impact the stressor has on psychological outcomes (Compas and Wagner, 1991; Gerard et al., 2005).

An important question, remaining largely unanswered in the literature, concerns the extent to which appraisals might be situation-specific or instead consistent across contexts (Kliewer, 1998, Lazarus, 1990, Roesch and Rowley, 2005). This thesis is focused on the significance of the cognitive appraisal process (in addition to coping and cortisol) in explaining individual variation in children's responses to *routine* stressors. By definition, routine stressors are experienced regularly. Given their frequency, consistency in the appraisal process could have significant implications for well-being. Consistently negative appraisals could lead to significant emotional and behavioural difficulties whereas consistently positive appraisals could potentially promote successful adaptation to stress and potentially also positive mental health (Hemenover and Dienstbier, 1996).

In order to explore whether appraisals are consistent or situation-specific we need to know what factors influence appraisals. What underpins the difference between categories of appraisal such as threat and challenge and is it possible that these factors can exert a consistent influence over appraisals in different contexts and at different times? There is gathering momentum for the idea that individuals can develop a relatively stable *style* of appraisal that predisposes them to consistently appraise stressors in the same way, though empirical testing has not been forthcoming (Ben-Porath and Tellegen, 1990, Hemenover and Dienstbier, 1998, Hemenover and Dienstbier, 1996, Hood et al., 2009, Roesch and Rowley, 2005, Weber and Laux, 1990).

In this chapter the literature on the antecedents of appraisal and the theoretical debate on specificity and consistency in the appraisal process is briefly reviewed. Appraisal styles are conceptualised and their relationship to outcomes is discussed in the context of the relatively few studies that have researched this elusive topic.

## **5.2 CONSISTENCY IN THE APPRAISAL PROCESS**

Although the empirical literature on appraisal has not developed at the same pace as other aspects of the stress response such as coping (Smith and Kirby, 2011), a number of studies have researched factors that might explain differences in the appraisals that children make (Mak et al., 2004; Smith and Dunst, 2006; Tomaka et al., 1997). This literature reveals that salient antecedents include stressor conditions, personal characteristics, and other mediators and moderators of stress (such as social factors and other stress response processes). It is proposed that some factors within these broad groups favour threat whilst others favour challenge (Lazarus, 2001). It is further proposed that some factors within these groups promote specificity (in other words inconsistency) in the appraisal process whereas others are likely to cause consistency.

### **5.2.1 Stressor conditions**

There is a significant emphasis within the literature on the particular characteristics of the stressor and the timing and context in which appraisal occurs (Park and Folkman, 2007). Evidence suggests that the extent to which a stressor is controllable, its length and duration, and whether it is unexpected or expected influence the types of appraisals that people make (Schneiderman et al., 2005, Tomaka et al., 1997). It is frequently hypothesised that threat is associated with uncontrollable, lengthier and unexpected stressors (Berry Mendes et al., 2001, Britton et al., 2011, Gunnar et al., 2009). Whilst a large body of evidence supports the notion that these types of stressors (such as abuse and neglect, natural disasters and bereavement) evoke stronger responses in children and adults (Carter and Garber, 2011, Hasan and Power, 2004, Lau et al., 2007), there are no studies that investigate patterns of appraisal across different types of stressors (McMahon et al., 2003). Stressor conditions and their relationship to the stress response process have been covered in *Chapter Three and also to a degree in Chapter Four*.

Given the emphasis on stressor conditions in the literature, the appraisals that children make are assumed to be situation-specific. Indeed, this is a defining feature of transactional theory in that it emphasises the unique transactions made between person and environment in the stress process (Lazarus, 2001).

Furthermore, it is suggested within the literature that the reason large numbers of people emerge unscathed from many different stressors can be explained by an ability to flexibly respond to the unique demands of different contexts. Ptacek et al. (2006) propose that flexibility in the appraisal process in relation to the particular conditions of a stressor confers flexibility in selection of coping strategies and that ultimately individuals who optimally match coping strategies to the demands of the stressor adapt better. It has also been suggested that flexibility (in other words cross-situational *inconsistency*) may well be the norm. Petersen (1991) for example, notes that in many studies of pessimism and optimism the large majority of participants are neither consistently one nor the other and generally score somewhere in the middle.

Writing about individuals who do not display consistency in how they interpret the events they experience, Petersen (1991) explains that “perhaps people with no particular explanatory style can be more sensitive to the actual causal texture of the world...perhaps a flexible point of view is better than a rose-coloured one. Indeed, preliminary evidence suggests that attributional “flexibility” is associated with better functioning in the world than is an optimistic explanatory style” (p.8).

If individuals are flexible and appraisals are truly situation-specific, the implication is that contextual variables and the characteristics of the stressors are of utmost significance as antecedents of appraisal, leaving personal characteristics largely redundant (Ben-Porath and Tellegen, 1990). Critics of the transactional model of stress argue that as a result of the emphasis on context, the ‘person’ elements of the person-environment transaction have been ignored (Oliver and Brough, 2002). For example, Oliver and Brough (2002) write that “the transactional theory tends towards a situational specific approach to stressful situations and consequently places little emphasis on broader dispositional variables which may affect the way in which an individual appraises their experiences” (p. 521).

In response to this criticism, Lazarus (1990a) reflects that the emphasis on context was a strategy designed to help establish *process* as an important variable in a field that was predominantly concerned with stimulus-response models of behaviour (see *Chapter One* for more on this particular topic). Acknowledging the importance of personal characteristics later in his career, Lazarus (1991) wrote that “while the transactional model typically focuses on situation-specific appraisals, this does not preclude the possibility that individuals may have dispositional tendencies to appraise stressors in habitual ways” (p.138).

### **5.2.2 Personal characteristics**

Personal characteristics or dispositional tendencies as Lazarus (1991) describes them could cause cross-situational consistency in the appraisal process because relatively stable patterns of thought, preferences and action might consistently favour threat over challenge or vice versa in a diverse contexts (Ben-Porath and Tellegen, 1990; Hemenover and Dienstbier, 1998; Petersen, 1991; Tong et al., 2006). Personal characteristics could be defined in a number of ways but the key concepts of relevance to this study are personality, intelligence and cognitive style.

Personality can be defined as “the relatively stable set of psychological attributes that distinguish one person from another” (Moorhead & Griffin, 2004, p. 91). Personality is often described in terms of stable patterns of behaviour, motivation and cognition (DeYoung, 2011). There are a number of studies indicating that specific personality characteristics influence the appraisal process in children and adolescents (Hankin et al., 2005, Shewchuk et al., 1999, Smith and Dust, 2006). Gallagher (1990) for example studied the effects of two personality attributes (extroversion and neuroticism) in university students’ appraisals of a recalled academic stressor. He reported that neuroticism was positively related to threat and negatively associated with challenge, whereas extraversion was positively related to challenge and negatively associated to threat. He hypothesised that highly neurotic individuals are more likely to experience negative cognitions and evaluate coping resources as inadequate and also more sensitive to punishment such that they are more likely to produce threat appraisals following exposure to a stressor. Extroverts on the other hand are more sensitive to reward are more likely to make challenge appraisals.

Gallagher's (1990) findings in the aforementioned study of university students were later replicated in a study of adolescents and their appraisals of academic stressors (Mak et al., 2004). The study was designed to examine the influence of personality on threat and challenge appraisals and adolescent depressive symptoms. Mak et al. (2004) reported that extroverted individuals are more likely to make challenge appraisals and experience fewer symptoms of depression in response to academic stressors. By contrast, adolescents self-reporting higher scores on a measure of neuroticism were more likely to make threat appraisals in response to academic stressors and experience greater levels of depression.

It should also be noted that personality is also conceptually linked to another personal characteristic – intelligence. "Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience" (Gottfredson, 1997a, p. 13). Intelligence can be viewed either as a construct that is categorically distinct from personality or as one construct within the larger domain of personality (DeYoung).

Cognitive styles on the other hand are "stable attitudes, preferences, or habitual strategies that determine individuals' modes of perceiving, remembering, thinking and problem solving" (Kozhevnikov, 2007, p.464). Though considered to be independent, cognitive styles, intelligence and personality are related constructs that together affect behaviour (DeYoung, 2011). Indeed, cognitive styles have been described as a bridge linking personality and intelligence with specific cognitive *processes* (Cools, 2009; Sternberg and Grigorenko, 1997). It is proposed that personality and intelligence influence cognitive styles which in turn influence cognitive processes and behaviour (Kirton, 1994).

There are several examples of negative and positive cognitive styles, perhaps most notably pessimistic and optimistic explanatory style (Chang, 2002, Chang et al., 2003). Optimistic and pessimistic explanatory styles are described as stable individual differences in expectancies about how events and stressors will impact on the self (Seligman et al., 2004). These styles in turn predict psychological well-being; optimists are happier than pessimists (Seligman, 2000, Seligman et al., 1984). Whilst this research has

been almost exclusively focused on adults, other researchers have provided evidence that *children* can also develop characteristic styles of thinking.

For example, research has shown that by age 12, children hold relatively stable beliefs about the nature of intelligence, some children believe that it is an unchangeable and 'fixed' entity (they have a 'fixed mindset'), others believe that intelligence is malleable and can be nurtured (they have a 'growth mindset') (Dweck et al., 1995, Hong et al., 1999). Even when levels of intelligence are held constant, children with 'fixed' mindsets consistently respond to academic stressors negatively and tend to give up on tasks quicker than those with 'growth' mindsets who consistently persevere for longer and actively engage with the task at hand. This translates into better academic performance and behaviour for children with 'growth' mindsets (Blackwell et al., 2007, Chiu et al., 1997, Hong et al., 1997, Hong et al., 1999). These studies also reveal that it is possible, through intervention, to transform children's entity theories into incremental ones (Blackwell et al., 2007).

A different approach was adopted by Hankin et al. (2005) in a piece of research involving 217 undergraduates aged 18-23 years old. Their methodology comprised an intensive, naturalistic daily diary study conducted over 35 consecutive days. Analysis of the data suggested that 'depressogenic cognitive style' consistently influenced the participants' appraisals in response to the daily stressors they routinely encountered. Appraisals, referred to as "event-specific inferences", were more likely to be negative for those displaying a depressogenic cognitive style. The depressogenic cognitive style exerted an influence over appraisals in response to stressors occurring at different times and in different contexts. Furthermore, the data revealed that depressogenic style interacted with appraisal to predict psychological symptoms.

Over and above the influence of personal characteristics such as personality, intelligence and cognitive styles there are several further arguments to support the notion of consistency in the appraisal process (Attwood et al., 2012) as will now be presented.

### ***5.2.3 The role of previous experience***

A situation-specific approach to appraisal does not fully account for the role of previous experience. Several studies have suggested that previous experience of stress contributes to the capacity of individuals to adapt (either positively or negatively) to future stressors (Masten, 2001, Seery et al., 2010). For example, the Quinton and Rutter (1988) study of risk and resilience in institutionalised girls indicated that successes in some activity at school such as achieving positions of responsibility, or successes in music or sport enabled the girls to develop a stable belief that they could deal successfully with life experiences (Rutter, 2012).

Specialists in child development propose that there are strong continuities between childhood and adulthood. Analysis of data from several longitudinal cohort studies reveals that acute life stress experienced in the early years influences later responses to subsequent stressors (Rutter, 2002; Rutter, 2007). Dumont and Provost (1999) report that children resilient to abuse and maltreatment from their parents are more likely to be resilient in adulthood, children who were not resilient at the time of the abuse experienced significant difficulties in later life and were less able to cope with stress. The mechanism by which different effects are ‘carried forward’ is not yet known, however Rutter et al. (2006) suggests that various factors such as genetics, altered patterns of social interaction or changes to brain structure or function are likely to play a role. Crucially, Rutter also proposes that cognitive sets - or characteristic styles of thinking - might propel the effects of early experiences through time (Rutter, 2013). Theoretically, successful coping with stress in childhood could lead to the development of a characteristically positive and adaptive style of dealing with stress. Conversely, a bad experience could result in a negative and maladaptive style (Britton et al., 2011). The application of those styles over time could impact on psychological health and functioning (Lazarus, 1991).

Furthermore, it is widely acknowledged within the theoretical literature that appraisals can occur at an unconscious level (Kappas, 2006; Smith and Kirby, 2011). “Having to go through the full process of learning anew about the import of threatening events and what to do about them would be a pretty inefficient way of monitoring our relationships with the environment. What could speed up the process of appraising is to draw on what

we have already learned from earlier experience in order to respond quickly and automatically to many adaptational crises, a process that commonly occurs without any necessary awareness” (Lazarus, 2001, p.51).

#### ***5.2.4 Consistency in other stress response processes***

Research suggests that consistency is observed in a variety of different stress response processes, so why not appraisal too? Several longitudinal studies suggest that children and adolescents display consistency in their coping styles (Carver, 2011; De Ridder, 1997; Fields and Prinz, 1997; Terry, 1994). For example, in a study of 341 students, findings suggested that that coping remains stable across time and context (Kirchner et al., 2010). Compas et al. (1988) found moderate temporal stability in coping in the context of similar stressors, though not across different types of stressors. A number of studies have reported similar findings, for example Frydenberg and Lewis (1991a; 1991b; 1993; 1996) conducted a series of prospective studies, each providing evidence of consistency in the coping styles of adolescents. In their studies coping styles are defined as “stable, preferred, coping strategies”, and they note that adolescents have different styles for different broad categories of stressor. Similarly, Griffith et al. (2000) focused on stability of coping styles in relation to three different types of stressors (peer, family, and academic) and reported moderate levels of consistency within each class of stressor. Children showed relatively stable preferences for avoidant coping strategies in response to different family-based stressors and by contrast a preference for approach strategies in response to school-based stressors.

Though there is a body of evidence to suggest consistency in the coping process there are some studies reporting that coping styles are more flexible and dynamic (Herman-Stahl, et al., 1995; Kirchner, et al., 2010). It is likely that some individuals have coping styles, whereas others do not. For example, Seiffge-Krenke and Klessinger (2000) suggested in a study of 194 adolescents, that 39% of them display relatively stable coping styles over a four year period, whereas 37% change their style and the remaining 24% were flexible over the full four-years.

In addition, biological researchers have noted that there is moderate stability across time and contexts in individual physiological stress responses (Cohen and Hamrick, 2003).



Reviews suggest that there is moderate stability in individual's cardiovascular, endocrine and immune responses to discrete but similar laboratory stressors (Cohen and Hamrick, 2003). It has also been suggested that chronic stress can lead to loss of flexibility in physiological systems such that they remain activated at consistently high or low levels (a phenomenon referred to as allostatic load in the literature) (Hastings et al., 2011).

### **5.3 EVIDENCE FOR CONSISTENCY IN THE APPRAISAL PROCESS**

Although stability in the appraisal process has received relatively little attention in the literature, there are several examples of studies to both refute and support the notion (Folkman et al., 1986). In one example, Folkman et al. (1986) explored the consistency of primary and secondary appraisal across five stressful encounters. The study of 166 adults revealed that appraisals tend to be more variable than stable. Though it is worth noting that appraisal was measured in relation to specific thoughts and acts at what Folkman et al. describe as a "micro-analytic level". By contrast, "informal observations of behavior suggest that people have characteristic ways of appraising and coping that transcend specific thoughts and acts, which a more abstract, macroanalytic approach might prevent" (Folkman, 1986, p.578).

Unpublished pilot work on appraisal style conducted by Power and Hill on college students, revealed that greater consistency in appraisals are found across minor rather than major life events (see Power and Hill, 2009). They explain that major events are more likely to "pull for" specific types of appraisal based on the particular characteristics of the event. This reflects the position of Hemenover (2001) who argued that "because daily hassles are likely to contain both positive and negative elements, they should be highly ambiguous. Searching for lost car keys, for instance, could be considered frustrating or an interesting challenge. As a result of this ambiguity, appraisals of such events should be highly vulnerable to the effects of trait-associated processing biases" (Hemenover, 2001, p. 393).

On the basis of the aforementioned pilot work Power and Hill (2009) conducted two studies in which approximately 300 undergraduates described their appraisals of a series of hypothetical but commonly occurring stressors. Each respondent was asked to rate the same events, including running out of money after paying bills, falling out with a friend,

being late for work, receiving a bad grade and running out of time to complete coursework. Their analyses showed that the students' had stable individual differences in styles of appraisal across situations. This is important because this study represents one of the first to empirically test the stability of appraisal across situations, but a significant limitation is that the stressors are hypothetical. It is possible that although people have a sense of how they might respond in a particular situation, their actual cognition in real-time might be different. Another limitation of this study is that the impact of appraisal style on other coping responses or on tangible psychological or behavioural outcomes was not measured.

Hood et al. (2009) recently studied patterns of appraisal style in younger participants. They recorded the appraisals that third, fourth and fifth grade students (ages 8 to 11) made in response to a series of hypothetical vignettes. The vignettes included 'overhears peers saying they do not like him/her'; 'breaks rule at home'; 'team loses game'; 'chosen last for team gym class'. The children showed moderate consistency in appraisal across stressors, particularly in how threatening they considered the situations, the degree to which they could predict their occurrence and any potential benefit they saw from the situation. These patterns were very similar to those found in the aforementioned studies on appraisal style in young adults and therefore tentatively support the notion that beliefs developed in early years may predict patterns of appraisal in later life.

It has been proposed that there is greater consistency in the appraisal process for stressors sharing similar qualities, but low levels of consistency in appraisals made in response to different stressors and in different contexts. In a 4-week study of causal attributions and coping styles in response to two ongoing stressors, Compas et al. (1988) report that "individuals appeared to maintain at least moderate levels of continuity and coherence in their appraisals and ways of coping in a single situation" (Compas et al., 1988 p.318)

Despite the evidence described in preceding pages, the debate with regards to whether or not there is consistency in the appraisal process has not yet been resolved. The vast literature on individual differences suggests it is probable that there are some individuals who do not demonstrate consistency in the appraisal process and there are others who

are consistent. If this can be established in empirical studies questions will follow about what is driving the consistency in this key stress response process. This issue is explored in the next section.

#### **5.4 APPRAISAL STYLE**

As described earlier, the originator of the model of appraisal acknowledges the potential for appraisal style. Lazarus (1991b), for instance, distinguishes between a variable appraisal process and relatively stable appraisal styles. Whereas the appraisal process is a function of conditions concerning the situations and the person, appraisal styles characterize “dispositions to appraise ongoing relationships with the environment consistently in one way or another” (Lazarus, 1991b, p.138).

Thus, conceptually speaking, an appraisal style is a moderator of the situational appraisals that individuals make in specific contexts, in other words styles are present before a stressful encounter and enhance or suppress challenge or threat appraisals made in response to novel potentially stressful environmental conditions (Karademas and Kalantzi-Azizi, 2004). The net result of the appraisal style is consistency across time and contexts in the types of appraisals that children make in response to different stressors (Hemenover and Dienstbier, 1998), by for example consistently appraising threat or consistently appraising challenge in impending changes, transitions or events that have the potential to be stressful.

The question follows, what is the underlying structure of an appraisal style? In other words, what are the cognitive factors that might produce consistency in the types of appraisal that children make in response to different stressors? A number of factors could drive consistency in the appraisal process. As Taylor (1983) notes “cognitions are both the easiest and the hardest thing to study empirically. They are easy because there are so many of them, and they are hard because it is difficult to know which ones are important and when” (Taylor and Brown, 1988 p.1167). However, there is support for cognitive styles in the literature. Rutter (2012) specifically highlights styles as a key influencer of children’s stress responses that potentially explain why some children are resilient to the negative effects of stressors and others are not. Cognitive sets, sometimes

also referred to as (cognitive sets, cognitive maps, mindsets, scripts, or core beliefs are underpinned by 'schemas' (Reisenzein, 2001, p.193).

### **5.5 SCHEMAS: WHAT THEY ARE AND HOW THEY DEVELOP**

The brain is an efficient organ designed to make short-cuts where it can. Having to always deliberate and learn anew about the significance of threatening events would be very inefficient, consequently the brain is wired in such a way that it encodes incoming information into different schemas (James et al., 2004). The schema is a stored body of knowledge representing beliefs, expectancies and prior experience of particular situations, objects, people or events (Eysenck and Keane, 2000). It is an organised "unit" of knowledge containing a collection of assumptions about something that ensures interpretation, processing and appraisal of new information can be conducted more efficiently. Schemata are "fundamental and enduring patterns that serve as basic, yet often unspoken, rules of life" (Karademas and Kalantzi-Azizi, 2004, p.1035).

Platts et al. (2001) explains that "on the basis of schemas we can interpret experiences in a meaningful way - they direct attention to previously stored information to generate expectancies and interpretations for new experiences" (p.338). For example, most people have a stairway schema and can apply it to climb staircases they've never seen before, another widely used example is the restaurant schema - although you may not have visited the establishment before you know on entry to wait to be seated, to order off the menu, to expect to pay for the meal and to tip the waiter.

Schemas influence how an individual perceives, appraises and encodes information regarding the current situation they find themselves in (Abela and Sullivan, 2003). Many studies have demonstrated that people are more likely to notice and attend to information that is consistent with their pre-existing beliefs and expectations (Riso and McBride, 2007). When faced with contradictory information that doesn't fit with the schema, an individual is inclined to view it as an exception, rather than to consider the possibility that the schema may be faulty - in a sense, people see what they expect to see (Shirk et al., 1998). Brewer and Treyens (1981) conducted a study that illustrates this point in the extreme. In their experiment, participants were requested to wait in a room identified as an academic's study. When asked later to recall the contents of the room,

several participants remembered having seen several books in the study when in fact there were none. Brewer and Treyens (1981) concluded that the mere expectation that books will be found in an academic's study prevented the participants from accurately recalling what they had seen.

Schemas are developed initially from early childhood experiences and feature prominently in many theories of child development, most notably those of Jean Piaget, who described schemata as the 'basic building blocks of intelligent behaviour' (Steinberg, 2005). As an infant is exposed to more and more experiences the schemas they build help them to make sense of new stimuli and in some cases are modified to accommodate new information. It is through the development and replacement of different schemas that children learn the skills and strategies that enable them to function in a variety of different settings. As the child matures his or her schemas become more numerous and elaborate (Gillibrand et al., 2011).

There are some rudimentary schemas regarding the self and its relationship with the world, formed in infancy during which time the human brain is especially receptive to environmental experience, that are considered to be 'hard wired'. Whilst they might become more complex and more elaborate, the essence of these schemas is preserved throughout development. Young et al. (2003) argue, for example, that schemas developed in infancy are more powerful and pervasive than those developed later in life following experiences with peers and school. In this instance the focus is on 'early maladaptive schemas' such as abandonment, instability and the self as unlovable that result in thoughts such as "If I assert myself, I will disappoint others", "my decisions are wrong" and "others disapprove of me". These schemas, Young et al. (2003) argue, are highly resistant to change and have a powerful pervasive influence on an individual's psychological and social health.

However, many theorists and researchers agree that schemas are in a state of flux until they consolidate and become stable in adolescence or even early adulthood - mainly because repeated learning experiences are required to reinforce the fundamental assumptions of a schema (Abela and Sullivan, 2003; Cole and Kaslow 1988; Cole and Turner, 1993; Hammen and Goodman-Brown, 1990; Rose and Abramson, 1992; Southall

and Roberts, 2002; Young et al., 2003). Support for this proposition is found in studies indicating that children increasingly use stable terms to describe themselves and their own behaviour the older they get, noticeably so by middle childhood (Nolen-Hoeksema et al., 1992). Furthermore, in a 5-year longitudinal study, Nolen-Hoeksema et al. (1992) documented trends suggesting that “early in life children’s explanatory style may still be under development, and negative life events, not cognitions, predict periods of depression. As children grow older and their cognitive capabilities increase, their explanatory style becomes more stable and appears to play a stronger role in the development of depressive symptoms” (Nolen-Hoeksema et al., 1992, p.417). Studies have also suggested that a period of depression during childhood may contribute to the establishment of negative explanatory styles. Nolen-Hoeksema et al. (1992) explains that “there are several ways that a pessimistic explanatory style could develop during a depressive episode. The deficits in school performance and peer interactions that children often show when depressed could convince a child that he or she has low abilities, is unlikeable and generally is not able to control important outcomes in life” (p.407).

It is important to note at this juncture that regardless of whether they are hard-wired and resistant to change or fluid and malleable until early adulthood, theorists agree that schemas can be identified and dismantled (Abela and Sullivan, 2003, Attwood et al., 2012, James et al., 2004, Wenzel, 2004).

## **5.6 APPLYING THE SCHEMA CONCEPT TO THE COGNITIVE APPRAISAL PROCESS**

It is plausible that children develop a schema for potentially stressful situations that influences appraisals in new and upcoming situations. Children might develop beliefs, assumptions and expectations about the impact of challenging or discouraging situations based on how successfully they coped with early life stress. For example, the origins of a negative appraisal style might be traced back to maladaptive experience in the early years, Roseman and Smith (2001) explain that “individuals who have experienced many uncontrollable events in early development may respond to later stressors with abnormal levels of anxiety because they have learned to appraise such events as unpredictable and uncontrollable” (p.10). Studies tend to focus on negative appraisal styles, largely because research in this area has been driven by the quest to understand the long-term sequelae

of chronic and acute stressors experienced in early childhood (Hankin et al., 2005, Mezulis et al., 2006). Given what is known about the potential for stress-related growth (as discussed in *Chapter Three*) is it possible that children develop a positive appraisal style from adapting well to a series of stressors in their early years? This potentially positive aspect of the stress experience has received far less attention in the literature, though several researchers have cited positive styles of thinking (or cognitive sets) as a potential mechanism explaining resilience (Rutter, 2013; Seery, 2011).

The schema essentially acts as a lens through which they view the world and thus a child might develop a strong sense of threat or challenge in an otherwise neutral situation. For example, a child who in the first year of primary school struggles to make friends and who reads with great difficulty might develop beliefs that they are unlikeable and have low academic ability. This child will be more likely to appraise future similar stressors, such as transition to secondary school, taking an exam, or making a presentation to their classmates, as threatening and difficult to cope with. This means that they are likely to act in a way that causes their expectations to come true and so the schema is further validated and reinforced.

Different children develop different lenses. Some are rose-tinted and colour the scene in a positive light. Negative schemas on the other hand sensitise people to the potentially threatening or negative aspects of new situations (Shirk et al., 1998). Consider this example; there are two students one with a threat-oriented appraisal style and one with a challenge-oriented appraisal style, both have been told that they must give a presentation on a project they are currently working on to their class. The threat schema of the former student ensures that in appraising the impending presentation task, he pays particular attention to the prospect that he might forget what to say, shake too much, that he might get asked difficult questions that he can't answer and that ultimately there is a good chance he will end up looking stupid. He ignores the potential for the presentation to be an opportunity to practice and hone presentation skills, that no one knows more about the project than he does and that his classmates might actually want him to do well. The student with the challenge-oriented schema might appraise the presentation task as a challenge because she ignores the potentially threatening information and attends only to the potential positives described latterly.

One assumption inherent within this conceptualisation is that appraisal style operates at a global level to influence appraisals of different stressors; in other words children develop a general schema that applies consistently to the majority of the stressful experiences they encounter. However, is it possible that children develop multiple schemas, each representing a different type of stressor? There is certainly evidence that this is the case for coping styles, as has been described earlier in this chapter. However, there is very little consensus about the optimal way to classify stressors, and there have been no studies of children's own perceptions of how stressors might cluster together. Perhaps children will develop an appraisal style for academic stressors that is different to interpersonal stressors and different again to physical stressors, but what does the evidence tell us?

Karedemas and Kantiz-Azari (2004) designed a study to test whether appraisal (and coping) acted as a mediator of the link between inner cognitive structures (schemata) and psychological health. In their study of 291 university students undertaken during an examination period, they reported that schemas constructed in relation to the ability to perform well in exams influenced threat appraisals that in turn predicted psychological health during an exam period.

Hemenover and Dienstbier (1996) developed and administered a general appraisal measure (GAM) in a study of 48 undergraduate psychology students who were about to sit an examination. The General Appraisal Measure was designed to assess individuals' tendencies to assess stressors as threatening or challenging and the extent to which they anticipate their coping efforts will be successful (Hemenover and Dienstbier, 1996). It comprises 21 stressors and life events, including several that are specific to university life, and asks respondents to rate each stressor according to "how stressful would this event be?" and "how able would you be to cope with this event?" (Hemenover and Dienstbier, 1996, p.304). The higher the score on the GAM, the greater the level of perceived stressfulness of the event and lower the level of perceived ability to cope (Hemenover and Dienstbier, 1998). Whilst it proved reliable in the aforementioned studies, the measure itself requires participants to respond to 21 hypothetical scenarios, some of which are highly specific to life as an undergraduate student. It is not, therefore, suitable for application with children or adolescents (Roesch and Rowley, 2005).



Hemenover and Dienstbier (1998) examined the relationship between general appraisal style and stressor-specific appraisals in a sample of (mostly female) 190 university students. The participants completed the GAM at the beginning of term and then every 2-3 weeks until the end of the term (approximately 3 months). Participants' scores on the measure were highly stable across each wave of data collection. Suggesting that they held appraisal styles that were consistent across time and across different contexts. Those styles also reliably predicted the types of appraisals that the participants made in relation to specific stressors. Hemenover and Dienstbier (1998) explain that "the more one generally viewed life events as threatening, the more negative and the less positive affect one experienced, the more one's life was viewed as uncontrollable, and the more a recent life event was appraised as threatening, stressful and difficult to control" (Hemenover and Dienstbier, 1998, p.248).

Preliminary research suggests that it is possible for children to display consistency in the appraisal process across stressor contexts, particularly in relation to routine stressors (Hood et al., 2009, Seiffge-Krenke, 1993). What are the consequences of consistency in the appraisal process for children's emotions and behaviour?

## **5.7 THE RELATIONSHIP BETWEEN APPRAISAL STYLE AND OUTCOMES**

There are few studies that examine the impact of appraisal styles on children's psychological outcomes (Hankin et al., 2005). In the study described earlier, conducted by Hemenover and Dienstbier (1998) on university students, the researchers reported that general appraisal style predicted greater levels of hostility and flu-like symptoms, independently of baseline levels. Rowley et al. (2005) through the course of developing and testing a measure of 'dispositional' appraisal for use in ethnic minority adolescents, noted that threat styles are associated with increased risk of depression and by contrast, challenge styles were significantly correlated with high levels of hope. Interestingly, Rowley et al. (2005) also report that threat styles are more likely to be linked to maladaptive coping strategies such as denial, disengagement, withdrawal, substance abuse and venting emotion. Challenge styles, on the other hand linked to active coping strategies like planning, growth and humour.

Although studies consistently find that maladapting to one stressful event can cause increased psychological problems, the risks associated with a single stressor are often small. Responding to multiple stressors maladaptively carries greater risk (Flouri, 2008, Flouri and Kallis, 2007). Research on clinical depression has demonstrated that a single stressor in isolation is not sufficient to evoke a depressive episode (Thapar et al., 2010). Responding maladaptively to *many* stressors, however, is associated with much greater risk; significant correlations between cumulative life events, chronic stress, daily hassles and depressive symptoms are consistently reported in the literature (Robinson et al., 1995). In addition, prospective research has shown that previously non-depressed individuals with negative biases are more likely to display depressive symptoms in the context of stressful life events (Brent and Weersing, 2008). The reasons why an individual responds negatively to the majority of stressors they encounter might be explained in a variety of ways but a negative style of cognitive appraisal might explain why some people respond maladaptively to a series different stressors (Cole and Turner, 1993, Flouri et al., 2013). Thus, a negative appraisal style might contribute to the development of, and be a feature of, clinical depression and anxiety problems (Robinson et al., 1995).

Sixth, it has been suggested that individuals with serious emotional and behavioural problems exhibit schematic information processing (Abela and Sullivan, 2003, Nolen-Hoeksema et al., 1992) that are similar conceptually to an appraisal style. For example, studies have shown that individuals who are depressed, or have previously been depressed, pay greater attention to sad and negative emotions and that negative cognitive biases are a key factor in the persistence of depression (Brent and Weersing, 2008, Harrington and Clark, 1998). Cognitive theories of depression rest on the concept of “cognitive vulnerability” (Haaga et al., 1991, Hankin et al., 2005) - “individuals with certain maladaptive thinking patterns (e.g. low self-esteem, negative attributional style) are at increased risk for depression when they experience negative life events because of how they interpret and respond to those events” (Carter and Garber, 2011 p.781). In relation to behaviour, Dodge (2008, 2013) found that aggressive children tend to focus on threatening elements of other people’s actions, often appraise neutral actions as hostile and as a result they display aggression in many social contexts (Moffitt and Scott, 2008). Theoretically, a threat-oriented appraisal style, applied systematically to different stressors over time, could contribute to (or be a feature of) the development of serious

psychological difficulties - making appraisal style an important area of inquiry both academically and clinically.

## **5.8 CONCLUSIONS**

Due to the dominance of the transactional theory of stress within the literature that places emphasis on the role of unique person-environment transactions in the stress process, it has been assumed that cognitive appraisals are influenced strongly by the context in which they occur. However, a series of theoretical and empirical arguments have been made in this chapter to suggest that there are cognitive styles (underpinned by schemas) that influence cross-situational consistency in the types of appraisal that children make in response to a range of different stressors.

Empirical research on appraisal styles suggests that some children display consistency in the types of appraisals they make and that this has consequences for their emotions and behaviour in stressful circumstances. It has also been suggested that the priority for further research is to investigate whether these findings can be replicated in prospective, longitudinal studies of real-world stressors (Power and Hill, 2009; Hood et al., 2009).

In the next chapter the design of a study forming part of this thesis is described. The study is primarily designed to examine the impact of two routine stressors on children's emotions and behaviour as well as the role of cognitive appraisal, coping and cortisol in explaining individual differences in their emotions and behaviour. The study design also offers an opportunity to examine consistency in the cognitive appraisal process across these two naturalistic stressors and thereby contribute to the literature on the elusive topic of appraisal styles.

## **CHAPTER 6: RESEARCH DESIGN AND METHODS FOR AN EMPIRICAL STUDY**

### **6.1 INTRODUCTION**

This chapter briefly outlines the epistemological and ontological framework adopted and describes in detail the methodology employed for the study. Information about the research design, sample, sampling methods, data collection methods, measures, data cleaning and screening, hypotheses, analytical techniques and ethical considerations are presented.

### **6.2 ONTOLOGICAL AND EPISTEMOLOGICAL FRAMEWORK**

This study is located within a positivist paradigm and thus in an ontological framework stipulating that there is an external, objective reality (Bryman, 2009). The epistemological principles of positivism include empiricism (observation and measurement) and an approach to scientific method that includes deductive reasoning (Haralambos and Holborn, 2008). Deductive reasoning is a stepped approach to research that starts with the development of a theory, leading to the generation of hypotheses, the testing of those hypotheses which in turn leads to confirmation (or non-confirmation) of the theory (Scott and Marshall, 2009). Thus the key features of positivist research are hypothesis-testing, the measurement of independent and dependent variables, seeking to control context, making predictions and examination of cause and effect (Chalmers, 1999).

By contrast, the ontology of interpretivism suggests that knowledge (and the world itself) is socially constructed and reconstructed by the social actors operating within it (Scott and Marshall, 2009). Epistemologically speaking, this approach is focused on understanding an individual's subjective worldview using qualitative methods (Willis, 2007). Such research is often open-ended and exploratory making it particularly appropriate for answering research questions such as how does the individual understand and what meaning has been created (Willis, 2007)?

Broadly speaking, a positivist approach and quantitative methods are appropriate for the current study because enough evidence has been generated in the vast stress literature to suggest concrete hypotheses about the workings of the stress response process (Bryman, 2009). The study is essentially concerned with understanding the relationships

between specific, identified, independent and dependent variables and attempts to uncover evidence suggesting cause and effect relationships (see *Chapter Two* for an outline of the conceptual framework for this study). Moreover, quantitative methods produce reliable data from which it is often possible to generalise observations to a larger population (Walliman, 2006). Arguably, this is an important prerequisite for the development of interventions and services designed to improve children's emotions and behaviour that can be delivered at scale – a particular concern of this thesis (see *Chapter One* and *Chapter Nine*).

However, it could be argued that there is a contradiction in the use of a positivist framework to examine the role of appraisal (and therefore subjective meaning) in the relationship between stressors and children's emotions and behaviour. How is a positivist framework compatible with the study of thoughts and emotions? Arguably qualitative methods are more appropriate when the question concerns an individual's subjective experiences. Lazarus himself grappled with this issue and writes that "for some, cognitive mediation refers primarily to subjective meaning, an implication that still makes many psychologists uneasy. Actually, my own outlook, which centers on an individual's appraisal, is not a true phenomenology. I take the position that, on the whole, people perceive and respond to the realities of life more or less accurately... so the subjectivism you will see here, if this is what it should be called, is really a compromise between the objective conditions of life and what people wish or fear" (Lazarus, 1999, p.5). In this quote Lazarus argues for a middle ground between the two paradigms, loosely interpreted as a call for mixed-methods research. Although a positivist framework and quantitative methods have been adopted for this study, this researcher is in agreement with Lazarus and believes that studies incorporating both quantitative and qualitative methods are entirely appropriate for the study of stress (also see Cooper and Dewe, 2004). Recommendations for future research, including the use of qualitative methods are outlined in *Chapter Eight*.

### **6.3 RESEARCH DESIGN**

One of the aims of this study is to determine whether the routine stressors under study (exams and transition) will produce a discernible change in children's emotions and behaviour. Establishing a causal relationship between stressors and outcomes, or indeed

between any independent and dependent variable requires a particular type of research design; experimental research is widely considered as the 'gold standard' for establishing causality (Sarantakos, 2005). In experimental designs participants are measured at a baseline and then randomly assigned to either a stressor (experimental) condition or a neutral (control) condition. The random assignment means that any naturally occurring changes in emotions and behaviour (observed in the control group) can be controlled for and therefore any remaining change in emotions and behaviour experienced by the experimental group can be confidently attributed to the experimental conditions – the experience of a stressor for example (Bloom, 2008). However, the stressors selected for this study are mandatory for all English children<sup>6</sup> and their timing is fixed by current education policy. It is therefore not possible to design an experimental manipulation whereby pupils are randomly assigned to a control condition in which they do not transfer to secondary school or take their SATs exams.

Whilst randomised experiments are the gold standard, quasi-experimental designs also have merit for questions of causality (Shadish et al., 2001). Quasi-experimental designs mimic experimental research in the sense that experimental and control groups are created but membership of those groups is not determined randomly or by chance (Cook and Wong, 2008). There is perhaps one population from which a natural comparison group could have been drawn for this study, children in the Scottish education system transfer to secondary school a year later than children in England and do not sit formal exams until the age of 14. However, the resources required to recruit a sample of Scottish children to act as a comparison group were not available within the confines of this PhD research and the different educational contexts are likely to create influences on emotions and behaviour that bias the results if not controlled for.

Instead, this study has a within-subjects, prospective, longitudinal design. Longitudinal studies are commonly used to test causal hypotheses when comparison groups are not available (Wolke et al., 2009). Longitudinal studies involve collecting information about what happens to a set of research participants over a series of different time points

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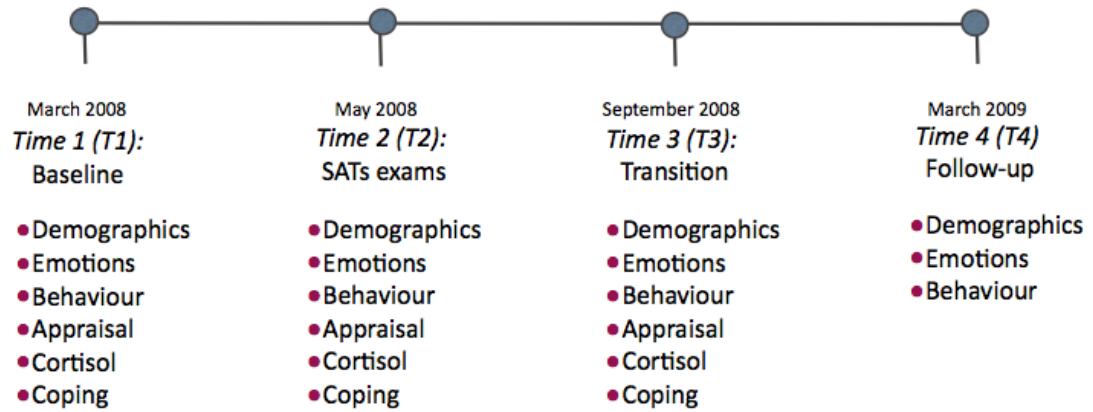
<sup>6</sup> Specifically children in mainstream education. Children in special education are an exception, so too are a small proportion of children who are educated within the three-tier system (primary, middle, high school). At the time this study was implemented it was reported that less than 400 middle schools remain operational in England (Crook, 2008).

(Elliott, 2008). In the present study this translated into tracking a sample of children at key time points over the course of the year in which they experienced both the SATs exams and transition to secondary school. Taking a baseline measurement, preceding the onset of exams and transition, makes it possible to statistically control for prior levels of outcome variables, in effect providing a within-subjects control group (Sarantakos, 2005).

One advantage of the prospective component of the design is that it overcomes the limitations associated with recall bias in retrospective studies. Retrospective longitudinal research is very common within the stress and coping literature; partly because retrospective designs require fewer resources to implement (re-contacting participants at various times is not required) and partly because in many cases it is not possible to identify relevant subjects prior to a particular stressor occurring, for example in instances of parental bereavement, acquired disability or serious injury (Elliott et al., 2008). Practical advantages aside, with the retrospective method there is no guarantee that participants will accurately remember past events, they may have different perspectives given the opportunity for hindsight or even actively try to forget negative experiences (Elliott et al., 2008). Prospective research on the other hand produces data that should reflect more accurately what children think and do in the moments in which they actually experience a particular stressor.

The design implemented for the present study comprised four different time points spanning one year of the participants lives. At a pre-stressor baseline in March 2008 (T1) data was collected on mental health difficulties, a range of demographic variables, cortisol levels, appraisal and coping. These data were collected again two mid-stressor timepoints in May 2008 (T2) on the day of a SATs exam, and later in September 2008 (T3) during the first few days of the children's first term at secondary school. Follow-up data post-stressor was collected between February and March 2009 (T4), comprising mental health outcomes and demographics only. See Fig. 5 for a visual representation summarising the waves of data collection.

**Figure 5: Summary of data collected at each wave of the study**



## 6.4 SAMPLING

### 6.4.1 Sample recruitment

The sponsor of this PhD, the Social Research Unit at Dartington (SRU), sought to undertake *pro bono* work in their local area of South Devon, England in line with its charitable aims to positively contribute to the community within which the organisation is based. The connections established with local schools through the *pro bono* project provided a starting point for recruiting the sample for the present study. Recruitment of participants conducted through schools was essential for several reasons: (i) schools provide a contact point through which the parents of all year six children could be invited to participate in the study; (ii) the Audio Computer Aided Personal Interviewing (ACAPI) data collection could be completed using IT facilities at school; (iii) partnership with the school helped to identify the researchers<sup>7</sup> as a credible and trustworthy part of the community, something that was particularly important given that one element of the data to be collected comprised biological samples; and (iv) students at local schools lived in the vicinity of SRU, enabling the researchers to visit participants and their families in person as part of routine data collection and if there were any concerns or queries from parents.

<sup>7</sup> Another PhD researcher sponsored by SRU gathered different data on the same pupils participating in this study. We shared responsibility for data collection, including picking up cortisol samples from children's homes, liaising with laboratory Salimetrics UK and both facilitated ACAPEI sessions in schools. All other aspects of the research were conducted separately.



After a presentation about the proposed research to the local learning community comprising 11 local authority-maintained primary schools, 9 primary schools (180 eligible children) committed to offering children in their year 6 classes an opportunity to participate in the research (see Appendix II for information leaflet for head teachers). Two schools opted not to get involved in the research study due to their role in other research studies and initiatives. Letters were sent home to the parents of children attending the participating schools and 66 children were eventually recruited (this indicates a response rate of 36%) (see Appendix III and IV for parent letter and consent form). This sampling technique is known as opportunity or convenience sampling, in that all of the participants who responded positively to the invitation were included in the research. Although it significantly limits the generalisability of the findings of this study to the wider population of children this age (Gobo, 2009), this particular sampling technique was selected because the researchers anticipated difficulty in recruiting families during inherently stressful and potentially chaotic times, especially given the demands of the saliva sampling technique outlined later in this chapter.

Sixty six children and their parents/carers were recruited to take part in the study. This sample comprised 33 female and 33 male children in their final year of primary school. Roughly half of the children were aged ten (38) whilst the remaining children were aged 11 years (28). Although there were a handful of children who defined themselves as black (1), mixed (1) or other (2), most described their own ethnicity as “white” (58). A summary of the key demographic characteristics of the sample are presented in Table 2.

It is important to note that this sample was not designed to be representative of the general population. Opportunity samples such as this are often criticised for being unrepresentative and so it can be helpful to try and establish the extent to which the characteristics of the sample reflect the characteristics of the population from which it is drawn (Sarantakos, 2005). The population from which the present sample was drawn comprised all year 6 pupils (i.e. children aged 10-11 years) attending 11 mainstream primary schools. Data from the 2011 Census survey reveals that the ethnic profile of the pupils in this sample is comparable to the local area more generally (98% of residents in the local government district are described as White British) (Office for National Statistics, 2011). Administrative data suggests that 13% of children in the district live in poverty

suggesting that children living in impoverished circumstances are over-represented in the sample for this study (although the measure of poverty for the local government district area draws on statistics relating to low income and household receipt of means-tested benefits, not socially perceived necessities as applied in this study) (Department of Health, 2012). It is also possible that the sample is unrepresentative according to some other factor. For example, it is likely that 'chaotic households' are not represented given the demands of the study and perhaps the children who gave consent to take part are those that are more inclined to view exams and transition as positive and challenging.

**Table 2: Sample demographics**

Sample demographic	Number of participants	Percentage of sample
<b>Gender</b>		
Male	33	50
Female	33	50
<b>Ethnicity</b>		
White	58	88
Other	4	6
Prefer not to say	4	6
<b>School attended*</b>		
School 1	12	18
School 2	10	15
School 3	5	7
School 4	3	5
School 5	13	20
School 6	1	1
School 7	5	8
School 8	15	23
School 9	2	3
<b>Poverty**</b>		
Living in relative poverty	25	39
Not living in relative poverty	26	38

*\* School percentages rounded to nearest whole number*

*\*\* Based on parent report; 15 parents did not return data*

#### **6.4.2 Methods for minimising sample attrition**

Attrition is a key methodological issue for longitudinal research in which the individual is the unit of analysis as there is a strong possibility that some participants will dropout, or not respond at each successive wave of data collection (Elliott et al., 2008). Participant losses can be random, but in many cases they are hypothesised to be systematically associated with social or biological characteristics. If those characteristics relate to the causal mechanisms under study, there is a strong chance that the conclusions drawn from the findings will be erroneous (Wolke et al., 2009).

Several steps were taken to maximise sample retention, these included a financial incentive at follow-up (£5 per participant), allowing participants an opportunity to complete questionnaires on paper at home if they missed data collection sessions at school, making regular contact with children and their families via telephone and letters, confirming addresses and telephone numbers at each contact point, providing freepost envelopes and notification of address change slips, and generally building up a rapport and relationship with participants and their parents.

#### **6.5 DATA COLLECTION: MEASURES AND METHODS**

The core concepts operationalised in this study are routine stressors, appraisal, coping, cortisol, emotions and behaviour (See Table 1 in *Chapter One* for a summary of the operational definitions of each of these concepts). All of the concepts were measured via child self-report questionnaires, with two exceptions: stressors and cortisol. Stressors were not measured, since they are experienced *ipso facto* by all of the children in the population from which the sample was drawn. Cortisol levels at T1, T2 and T3 was measured via saliva sampling (more detail is provided in the *measuring cortisol* section of this chapter).

Measures for this study were selected according to (i) the availability of the measure and relevant scoring instructions at little or no cost; (ii) reliability and validity in relation to 10-11 year old children (alpha of 0.7 or above); (iii) child self-report was possible; (iv) the measure could be incorporated into electronic ACAP software for computer-based

completion; and finally (v) the length and ease of its administration. More detail on the selected measures follows.

### **6.5.1 Measuring demographics**

A series of questions were posed at the start of each survey that capture information about demographics. Children were asked to report their gender, age, date of birth, ethnicity and provide information about their living situation.

Information about socio-economic status (or family income) was gathered in two forms. First the children's parents or primary care-givers were asked to complete a short questionnaire (at T4), derived from the much larger Breadline Britain surveys of 1983 and 1990, about their access to 'socially perceived necessities' (Joseph Rowntree Foundation, 2000). In this instance, poverty is measured according to deprivation from goods, services and activities defined as the necessities of modern life in Britain. The 10 necessities, developed from extensive research with the general population, include 'a hobby or leisure activity', 'regular savings of £10 a month for a rainy day or retirement fund', and 'to keep your home adequately warm in the winter'. Respondents tick which items they cannot afford, ticked items are summed together to provide an overall score. Higher scores indicate lower levels of income and a score of 2 or above (out of 10) suggests that the participant is financially impoverished (living in relative poverty). A score of zero indicates that the participant can afford all modern necessities and is therefore likely to have an adequate level of family income.

### **6.5.2 Measuring appraisal**

Cognitive appraisal was measured using the *Stress Appraisal Measure for Adolescents* (SAMA). The SAMA is a short self-report questionnaire comprising a total of 14 items across three subscales: threat, challenge and resources to cope. Amongst the items for the challenge subscale are 'I have the ability to overcome stress' and 'I can positively attack stressors'. The threat subscale includes items such as 'the event has serious implications for my life' and 'stress has a negative impact on me'. Whilst threat and challenge represent primary appraisals, the resources subscale refers to secondary appraisals and includes items such as 'I have what it takes to beat stress', 'there is someone I can turn to for help'. Each item is rated according to a 5-point scale from 'not

at all' to 'a great amount'. A score is generated for each subscale by calculating the mean response across all of the items pertaining to the particular scale (the minimum and maximum possible scores for each subscale range between 0 and 4). The higher the mean score for a subscale, the stronger that particular dimension is evident in children's appraisal of the specified stressor.

At baseline, participants were instructed to respond to the items on the questionnaire whilst thinking about how they generally respond to stressful experiences. At T2 they were asked to think specifically about exams and T3 to think about the transition.

The SAMA, is at present the most reliable measurement tool available for the investigation of children's cognitive appraisal of stressors and it was selected for this study. Researchers have measured appraisal in adult populations using a variety of methods including single-item scales, adjective checklists, situation-specific measures of appraisal and more general measures of 'perceived stress' (see Monroe and Kelly, 1997). All of these methods have questionable levels of internal reliability and do not explore the multidimensional components of appraisal, such as primary and secondary appraisals. Appraisal theorists Lazarus and Folkman (1984) developed a more complex measure (Ways of Coping Questionnaire), it is criticised however for having subscales with low internal reliability (Peacock and Wong, 1990). Another source of criticism is the lack of any concrete delineation between appraisal, coping and emotions as the measure was not subject to any factor analytic procedures (Roesch and Rowley, 2005).

Peacock and Wong (1990) developed a measure of appraisal that was designed to be applicable in a variety of contexts and captured the distinction between primary and secondary appraisals. A forerunner of the SAMA, early tests of the *Stress Appraisal Measure* (SAM) revealed that a number of the initial subscales had low levels of internal reliability and the overall factor structure of the *Stress Appraisal Measure* was relatively weak, the measure was later revisited by Roesch and Rowley (2005) in a sample of ethnic minority adolescents. They found that of the four factors in the measure (challenge, threat, centrality and resources), the centrality factor was not relevant (centrality refers to the extent to which the stressor is perceived to impact on one's life) and thus removed it. The new measure demonstrated internal reliability and adequate convergent and

discriminant validity as demonstrated by its correlations with measures of depression and coping styles (Rowley et al., 2005).

### **6.5.3 Measuring appraisal style**

The SAMA as described earlier generates subscale scores in the form of continuous data. In order to analyse the extent to which participants demonstrate consistency in their appraisals across contexts, categorical statements about what type of appraisal a child has made at each time point are required. In order to create these categories, several methods were applied and tested following guidance outlined by DeVellis (2003). The method selected prescribes that a respondent who has a total subscale (threat, challenge or resource) score that is at least half of the total possible score for the scale is categorised as having made that type of appraisal. Three dichotomous variables were thus created: challenge 1 = yes, 0 = no; threat 1 = yes, 0 = no; and resources 1 = yes, 0 = no. A score of 1 in the challenge subscale means that the child has met the threshold and can be described as having made a challenge appraisal, likewise for threat and resources.

### **6.5.4 Measuring coping**

The CSCY is a 29 item self-report questionnaire used to measure the range of behavioural and cognitive coping strategies that children deploy in response to a particular stressor. It captures four “conceptually meaningful patterns of coping” (Brodinzinsky et al., 1992, p.212) described as assistance seeking; cognitive behavioural problem solving, cognitive avoidance and behavioural avoidance. One advantage of this measure is that, in a departure from previous measures of coping, the four broad strategies have been identified by children themselves in response to a wide range of commonly experienced stressors, ranging from school-based stressors to family- and peer-related stressors (Brodinzinsky et al., 1992).

The four strategies, map neatly onto those identified within the broader coping literature. The assistance seeking and cognitive behaviour problem-solving subscales can be described as approach strategies (see *Chapter Four* for more information). The assistance seeking scale comprises items such as asking for help from another person, getting advice from others and sharing feelings. The cognitive-behavioural problem-solving scale refers to attempts made to think about what to do about a problem, making plans and thinking

about the problem in different ways. By contrast, the cognitive and behavioural avoidance subscales refer to avoidant strategies. The former relates to trying not to think about the problem, pretending that nothing was wrong or that it wasn't important or real. Similarly, the behavioural avoidance subscale contains items such as going to sleep so as not to think about the problem, trying not to feel anything or feeling numb, avoiding people who serve as a reminder for the problem or simply being mean to someone else whilst upset about the problem (Smith and Brodzinsky, 2002).

Children record the frequency with which they use the particular coping strategy represented by each item according to a four point scale - i) not at all; ii) sometimes; iii) often; iv) very often. Mean scores for each subscale are then calculated (yielding a maximum mean score of 3 and a minimum of 0, the higher the score suggests the greater the individual uses that particular type of coping strategy). Studies have shown that the CSCY measure is valid and reliable for use with white middle class children aged 10 to 15 years, Brodzinsky (et al, 1992) report a high degree of test-retest reliability and average coefficient alphas of 0.8. In a later study, Smith and Brodzinsky (1994) administered a version of the CSCY to children as young as six and found correlational patterns indicating that the psychometric properties of the questionnaire may be valid for much younger children. The validity of the measure amongst UK children and children from different ethnic minorities or special populations, however, has not yet been determined.

The CSCY was designed to be flexible so that participants could complete the questionnaire with reference to either a self-identified stressor or to a stressor established by the researcher. In the present study, children were instructed to self-identify a stressor at T1, and to think about a specific stressor at T2 (exams) and T3 (transition). At T1 children were asked to think about a particular problem in their life and describe it in a free text box on the questionnaire, and then asked to rate the items on the questionnaire according to how they dealt with the problem they described.

Prior to the development of The *Coping Scale for Children and Youth* (CSCY) procedures for assessing coping in children were predominantly interview-based or observational (adult measures were more likely to be self-report questionnaires) (Brodzinsky et al., 1992). Whilst the interview method has its advantages, there are significant limitations.

For example, interviewers might unintentionally influence the responses of interviewees and cause unwanted effects, especially where sensitive issues are concerned (Leeuw, 2008). The CSCY (Brodinzensky et al., 1992) was developed to offer a less resource-intensive, standardised alternative that could be used in large-scale data collections. There are other self-report questionnaires of coping, but many are lengthy (containing up to 88 items) and are not supported by evidence of validity or reliability (see Compas et al., 2001 for a review).

#### ***6.5.5 Measuring emotions and behaviour***

The Goodman Strengths and Difficulties Questionnaire (SDQ: Goodman, 1997) was selected as a measure of children's mental health difficulties. The SDQ is a brief screening questionnaire that provides coverage of children's behaviour, emotions and relationships. It taps into five distinct dimensions of children's mental health: conduct problems, emotional symptoms, hyperactivity, peer problems, and prosocial behaviour.

The questionnaire is comprised of 25 items, with five items for each different dimension (conduct problems, emotional symptoms, hyperactivity, peer problems, and prosocial behaviour). Items include 'considerate of other people's feelings'; 'often has tantrums or hot tempers'; 'rather solitary, tends to play alone'; 'many worries, often seems worried'; 'helpful if someone is hurt, upset or feeling ill'; and 'easily distracted, concentration wanders'. Informants rate items according to a three point Likert scale comprising 'not true', 'somewhat true' and 'always true'. Each item is individually scored and then summed to create a score for each subscale between 0 and 10, higher scores indicate greater problems, except for the prosocial subscale within which lower scores indicate greater problems. A total difficulties score can be generated from summing all of the items (excluding items from the prosocial subscale a maximum score of 40 is possible). For the purposes of measuring children's outcomes following exposure to routine stress, in this study the total difficulties subscale has been used as a measure of global mental health functioning, with the analysis drilling down into specific effects on the conduct problems and emotional symptoms subscales.

The SDQ is notably shorter than other comparable measures, the Achenbach Child Behaviour Checklist (CBCL), for example, is over 100 questions long. The SDQ contains 25



questions fitting onto just one side of A4 sized paper. Despite being shorter, the SDQ has comparable predictive value, reliability and validity levels as the CBCL. Studies consistently report reliability co-efficients (alphas) of .8 or above (Goodman and Scott, 1999).

Although there are teacher and parent report versions of the SDQ, the child self-report version (suitable for children aged 11-16) was adopted for this research. Goodman et al. (1998) report that SDQ works most effectively when simultaneously completed by teachers, parents and children. However, this was not possible given the economic and resource constraints of this PhD and several studies have shown (see Grant et al., 2006) that in many instances adolescent children provide more reliable accounts of their own symptoms than their parents.

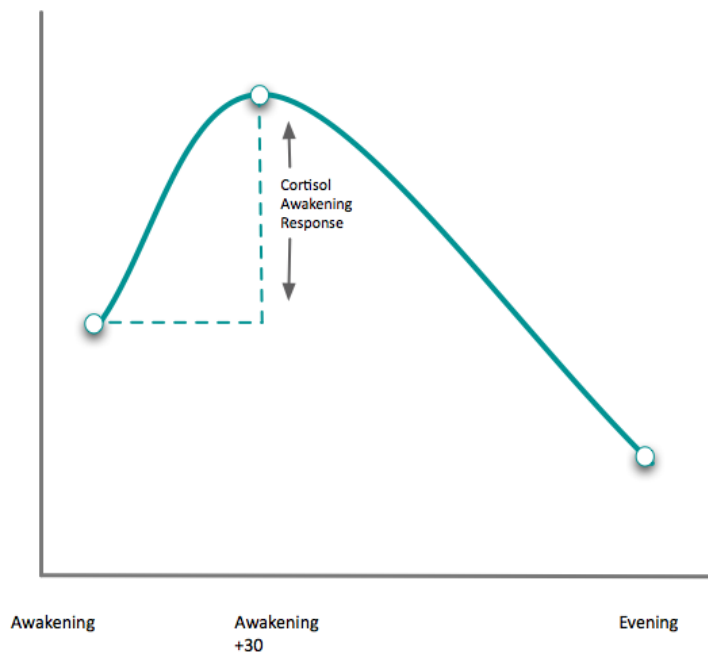
#### ***6.5.6 Measuring cortisol***

There are several different physiological products that could be assessed to determine whether a subject is physically responding to a stressor. These include adrenaline, heart rate, blood pressure and dehydroepiandrosterone (Clow, 2004). However, in the present study, the functioning of the HPAA was measured via samples of cortisol in saliva. Cortisol is a core component of the HPA-axis, and as described in *Chapter Four*, under normal circumstances a healthy individual naturally secretes different concentrations of cortisol at different times of the day. This circadian cycle plays an important part in synchronising bodily functions around the 24-hour light/dark cycle (Clow, 2004).

Large amounts of cortisol are produced in the second half of the night with peak levels occurring in the early hours of morning - specifically within the first 30-45 minutes of waking (this particular section of the cycle is known as the cortisol awakening response or (CAR). Throughout the remainder of the day cortisol levels steadily decline reaching their lowest levels in the first half of the night (Fries et al., 2009). As Ruttle et al. (2011) note, “a surge in morning cortisol followed by a steady decline helps initiate waking activities and primes the body for the demands of the pending day” (p.124). The pattern of cortisol secreted by an individual over the course of 24 hours is referred to as their diurnal cortisol profile and is represented visually in Figure 6.

Moreover, there is a growing interest in a specific section of the cortisol circadian cycle - the cortisol awakening response (CAR) - defined as the period of cortisol secretory activity in the first 45-60 minutes immediately post-awakening (Canty-Mitchell and Zimet, 2000; Thorn et al., 2009). There is a suggestion within the literature that the CAR is highly sensitive to a variety of psychosocial variables and that it provides a marker of how stressed individuals are in relation to the demands of the day (Chida and Steptoe, 2009; Clow et al., 2010).

**Figure 6: An illustration of the diurnal cortisol profile and cortisol awakening response**



Disruptions to the diurnal profile of cortisol are an indication that a person is physiologically stressed. Disruptions can occur in the form of short spikes, usually in response to an acute stressor such as electric shock, or increases in total cortisol output over the course of a day or a number of days. However, in some instances chronic exposure to a stressor can produce persistent 'dampening' of the diurnal profile - also referred to as a hypoactive HPA (Fries et al., 2009). Recent research has also indicated that the CAR, as a discrete section of the circadian cycle of cortisol, is particularly sensitive to the effects of psychosocial stressors (Clow, 2004). An increase in cortisol secreted as part of the CAR is believed to represent anxiety in anticipation of the upcoming day (Fries et al., 2009). The stressors investigated in this study (exams and transition) are both events that children are expecting and that persist for a number of days. It was therefore deemed appropriate to measure cortisol responses in relation to

changes in total cortisol output from waking to evening, as well as changes specifically to the CAR in order to detect whether the HPAA is disrupted in response to the demands of the stressors.

There are several different ways that cortisol can be measured, some researchers collect blood or urine samples for example. There are many reasons why saliva sampling is preferable over other methods (see Ice and James, 2007). Saliva sampling is a relatively non-invasive technique and therefore particularly suitable for child populations. Studies have shown that the HPA axis is sensitive and responsive to the anxiety caused by more invasive methods (such as blood taking) leading to contamination of the research data (Clow et al., 2010; Gallagher et al., 2006; Hellhammer et al., 2009). Another reason why saliva sampling has been selected is the relative ease with which the technique can be applied - small amounts of saliva that can be collected on a mouth swab are all that is required to detect cortisol. This means that multiple sampling by participants in their own homes at several timepoints is achievable (Gallagher et al., 2006; Jessop and Turner-Cobb, 2008).

Cortisol was collected over a period of three consecutive school days, at T1 (pre-stressor), at T2 (exams) and finally at T3 (transition). Cortisol was not collected at T4 because the focus of this study was on cortisol as a biomarker of a physiological process that occurs in response to the presence of two specific stressors (exams and transition). Each day a swab technique was used in order to obtain three salivary measurements at awakening, 30-45 minutes post awakening and 8pm bedtime. The three measurements together provide data on the diurnal profile (Hellhammer, 2007; Adam and Kumarib, 2009). The Awakening and post awakening measurements were used in order to assess the cortisol awakening response. Previous research has shown that many individuals exhibit wide variations in cortisol volumes on a day-to-day basis (Hellhammer, 2007; Hruschka et al., 2005; Rosmalen et al., 2005). In order to control for this variation studies often collect samples across multiple days (at least two and ideally more) (Adam and Kumarib, 2009; Rosmalen et al, 2005).

All of these measurements are taken at home, supervised by parents. The absorbent swab<sup>8</sup> is made from an inert polymer suitable for use with adults and children over 6; it is highly durable and can withstand chewing by the participant. The swab is placed in the mouth under the tongue or between the cheek and lower teeth and remains there until saturated with saliva (this usually takes about two minutes but may take longer). The swab is then placed in a test tube and stored in a freezer until collected by the researchers.

As noted in Levine et al. (2007) there are several confounders that might arise in home-testing that are not encountered under strict laboratory conditions. For example, traces of food and drink can contaminate samples as can the presence of blood caused by oral lesions or the recent brushing of teeth. Due to forgetfulness, or other factors, participants may not collect samples at the times specified and either miss them or provide them at an unspecified time. Whilst detailed procedures and instructions were developed (see Appendix V for copies of the protocols) for the children and parents participating in this study, there was inevitably going to be some degree of deviation from those instructions. As a consequence and in order to be able to account for any anomalous findings, parents were required to record in a 'cortisol diary' the exact times at which the cortisol data was collected, any information about medications or food supplements (as these can affect cortisol) (Hellhammer et al., 2009) and any other notes (see Appendix VI for an example of the cortisol diary).

Upon completion of the data collection, the saliva samples were shipped securely to Salimetrics UK where they were subject to radioimmunoassay - the technical process of extracting cortisol levels from the saliva. The raw data supplied by the lab comprises multiple variables that represent each saliva sample collected at every time point in the study. A mean value for each time point i.e. awakening, post awakening and evening is calculated using the data gained over three consecutive days, so that for each wave of data collection there is a single awakening, post-awakening and evening value for each child. Samples were excluded from the calculation if the associated 'cortisol diary'

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<sup>8</sup> All of the equipment required to collect saliva samples was purchased from a licensed laboratory - Salimetrics UK.

suggested potential contamination or deviation from the sampling instructions in accordance with guidance outlined by Granger et al (2009).

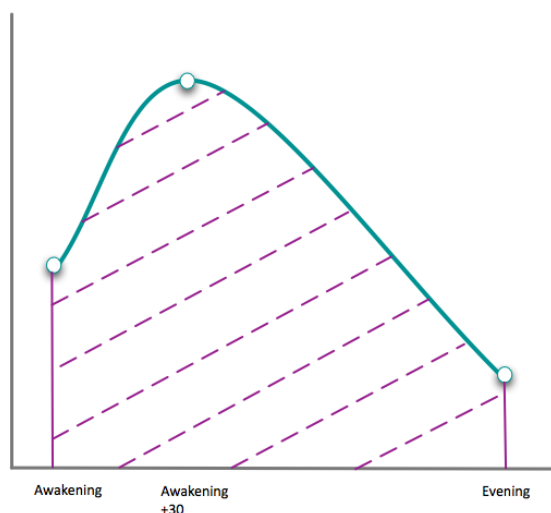
Several summary measures that transform multivariate cortisol data into meaningful univariate variables have been suggested within the literature to simplify the analysis of cortisol data (Fekedulegn et al., 2007). Fekedulegn (2007) notes that there is a high level of inter-correlation between different summary measures and that for ease of presentation and interpretation of analyses as small a number as possible should be employed. An increasingly common calculation however is the area under the curve analysis (AUC). Preussner et al. (2003) explains that “computation of the AUC allows the researcher to simplify the statistical analysis and increase the power of the testing without sacrificing the information contained in multiple measurements” (p.917). Thus, AUC values have been calculated for the present study.

One advantage of AUC is that it can be used to estimate circadian changes to hormones as well as total secretion over a specific time period. There are two different formulas for each purpose (AUC<sub>G</sub> and AUC<sub>I</sub>) (Fekedulegn et al., 2007) and researchers recommend that both formulas are deployed in statistical analyses as the values gained from each are potentially related to different psychological variables (Chida and Steptoe, 2009; Pruessner et al., 2003).

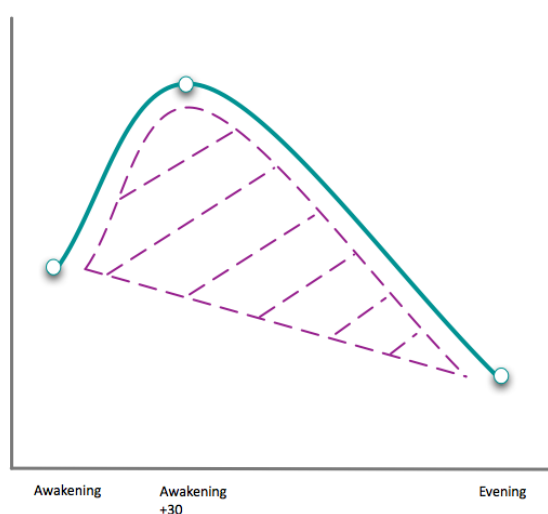
AUC<sub>G</sub> refers to area under the curve with respect to the ground and it is a measure of total cortisol output and diurnal cortisol profile. It captures sensitivity (the differences between each of the single measurements) and intensity (the distance of the measures from the ground (zero) (see fig.7). The larger the size of the AUC<sub>G</sub> value, the more cortisol a participant has secreted during the course of the day indicating more pronounced physiological response to environmental stressors. Conversely, AUC<sub>I</sub> or ‘area under the curve with respect to the increase’ ignores the distance from the ground and measures changes in cortisol secretion over time. The magnitude of AUC<sub>I</sub> varies according to the shape of the slope (see fig.8) - a high value represents a steep slope (sharp increase of cortisol) and a low value a relatively flatter slope (steady levels of cortisol). The value of AUC<sub>I</sub> is positive where cortisol secretion increases over time and negative where cortisol decreases between measurements. In instances where cortisol both increases and

decreases between measurements, AUCi can be either positive or negative depending on the size of increase relative to decrease (Fekedulegn et al., 2007).

**Figure 7. Area under the curve with respect to the ground (AUCg)**



**Figure 8: Area under the curve with respect to the increase (AUCi)**



In this study, the AUC calculations are applied to the diurnal cortisol profile and separately to the CAR. Thus, CARAUCg represents total cortisol output during the awakening response - measured at awakening and 30-45 minutes later and CARAUCi refers to the dynamic increase at post-awakening in relation to the first waking sample (Clow et al., 2010).

### **6.5.7 Data collection methods**

At T1 and T2 the participants completed all of the self-report questionnaires online using audio assisted computer interviewing (ACAPI), in school and under the supervision of the current researcher or colleague. This served a number of purposes, on a practical level it reduced the need to input data, but more importantly it provided an opportunity for the researchers to meet the children participating in the study, explain the research as well as answer any questions they may have had. It also enabled the researchers to establish a rapport with the children to help ensure that they remain engaged with the study at later data collection points. Those who were not at school or unable to participate in the ACAPI during the pre-set times were offered the option of completing the questionnaires on paper at home. Paper-based versions of the questionnaires were circulated to all children at T3 and T4. The circumstances surrounding these data collection points limited the feasibility of using the ACAPI. For example, lesson time could not be spared during the first week of term in the new secondary school.

## **6.6 ETHICS**

Ethical approval was sought for this project both from an independent ethics committee on behalf of the Social Research Unit and from the University of Bath ethics committee. The salient ethical issues arising from the present study included informed consent, storage of electronic data, storage of human tissue and any potential harmful effects from participating in the study. See Appendix X for documentation submitted to the ethics committees.

### **6.6.1 Ethical principles for research involving children**

There is a general consensus concerning the core ethical principles guiding research with children (Alderson and Morrow, 2011; King and Churchill, 2000). These principles include: scientific soundness; sufficient importance; respect for autonomy, beneficence and non-maleficence; and justice or fairness. According to Berry (2009) these principles have informed many policy documents in the UK and elsewhere, including the World Medical Association's *Declaration of Helsinki* guidelines.

Scientific soundness and sufficient importance refer to the need for research to adopt a carefully considered methodology and to also ask and provide answers to "questions

important to the welfare of children - or hold substantial promise of benefit to children” (King and Churchill, 2000, p.712). This chapter has outlined, in detail, the methodology for the present study and the rationale for the sampling procedures, data collection tools and process, and statistical analytical techniques. In the Introduction to the thesis, and in *Chapter Nine* and *Chapter Ten*, the potential implications of the study for children’s services practice and policy are outlined.

Autonomy refers to “behaviour that is both voluntary and intentional” (Fombad, 2005). Provision for this particular ethical principle requires researchers to ensure that children have the freedom to decide whether to participate in the research and stipulates that they should be free from coercion (Alderson and Morrow, 2011). Informed consent is key to maintaining children’s autonomy as is the right to withdraw from the research at any time (Berry, 2009)- the steps taken to guarantee informed consent for the purposes of this study are described later in this chapter.

Non-maleficence and beneficence both concern the broad principle of *primum non nocere* (first, do no harm) which has its roots in the Hippocratic Oath (Fombad, 2005). Non-maleficence “requires researchers not only to avoid any harm to research participants, whether intentional or negligent, but also to minimize any risks of such harm however minor the risk may be...the duty of nonmaleficence, it has been said, does not require omniscience, just knowledge and careful, prudent judgement” (Fomad, 2005, p.108). Beneficence might be considered an extension of the obligations attached to non-maleficence by requiring researchers to implement research that maximises the benefits and minimizes the possible harm to participants (Macklin, 1992). “Because a large amount of social research with children does not benefit the research subjects directly, it is therefore imperative that the benefits to other children must clearly outweigh any risks to the subjects themselves” (Fombad, 2005, p.108). As will be described later in this chapter, the potential risk of harm to children arising from participation in the present study is minimal. Moreover, though the findings of the study are unlikely to benefit the participants’ directly, the findings will contribute to a larger body of research designed to identify appropriate and effective ways of reducing children’s emotional and behavioural difficulties in the context of stress.



Justice or fairness “requires that there should be no bias towards the research subjects on the basis of age, race, gender, culture and any other variables that are irrelevant to the research process” (Fombad, 2005, p.109). Thus all participants should be treated equally and receive the same level of information regarding the study (Berry, 2009). It also requires researchers to avoid recruiting participants that are unlikely to directly benefit, or indeed represent others who may potentially benefit from, the broader applications of the study’s findings. This thesis is concerned with the impact of routine stressors that by definition are experienced by the majority of children. In order to be eligible for participation in the study, children must be exposed to these stressors and their exposure is the result of current education policy regarding examinations and the transition between primary and secondary schooling. Though the sample is not representative of the general population, the findings of this study and implications for policy and practice will be applicable to children in similar circumstances. All of the children in the study received the same information from the researchers, regardless of their gender, age, race and ethnicity.

#### **6.6.2 Informed consent**

The parents/carers of all children within participating schools were sent a letter explaining the study and asking for parental consent. This letter outlined, in accessible language, both the purpose of the research, and detailed information on the salivary and self-report measures involved in the study. Parents were made aware that they could ask questions or raise concerns about the research at any time and were supplied with the telephone numbers and email addresses of the two researchers implementing the study. The parental consent letter clearly stated that all information obtained is entirely confidential to the researcher and no information about specific individual children would be passed on to parents or schools.

For children under the age of 16 years, it is considered best practice to obtain informed consent from both parents and children themselves (Berry, 2009). Thus, when children logged on to the internet to complete the ACAP questionnaires and on the front page of the paper questionnaires they were presented with an informed consent page. The consent page provided information comparable to that of the parental consent form, again in an easy to understand and non-threatening manner. If at any point parents or

children did not consent to take part, no data were collected. Similarly, it was explained that both parents and children had the option to withdraw from the study at any point, without recrimination.

The purpose of obtaining salivary cortisol measures was clearly explained in parental and child consent procedures, along with reassurances that no DNA would be extracted from the saliva and that samples would be anonymous to those staff analysing samples at the laboratory. It was also made clear that once analysis of saliva was complete the samples would be destroyed. The only purpose for collecting saliva was for cortisol analysis.

### ***6.6.3 Collecting salivary cortisol***

A comprehensive yet simple to understand protocol was provided to both parents and students, alongside a practical demonstration (where possible) to ensure that participants collected the saliva appropriately and without difficulty. It also outlined how to handle the saliva samples once collected; this is purely for the purposes of ensuring data integrity; there are no safety issues since saliva is not classified as a biohazard<sup>9</sup> and therefore poses a minimal risk to health of participants or those around them.

### ***6.6.4 Confidentiality and data protection***

All individual child data were entirely confidential to the researchers. Each individual taking part was asked to provide some unique identifiers (including name, date of birth and contact details) so that they can be followed through the course of this brief longitudinal study. However, unique identifiers were separated from all data at the earliest opportunity and stored securely in a separate location (this applies to both the self-report data and the saliva samples). Individual data was linked by a random identification number. Only the researchers have access to the data.

There are legal requirements related to the storage, use and disposal of saliva samples, regulated by the Human Tissue Authority (HTA) and subject to the *Human Tissue Act* (2004). If researchers wish to store human saliva for research purposes they must either hold an HTA license or pass all research through an NHS REC ethics committee. In this

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<sup>9</sup> According to *The Control of Substances Hazardous to Health Regulations 2002*:  
<http://www.opsi.gov.uk/SI/si2002/20022677.htm#sch5>

study the researcher visited participants' homes in order to collect all the samples for immediate and secure courier shipping to the analytical laboratory contracted to conduct the cortisol analysis (Salimetrics UK). No samples were stored by the researcher. Salimetrics has an HTA license (to store human tissue), thereby complying with HTA regulations. Once levels of cortisol were successfully obtained from the saliva by immunoassay the saliva samples were destroyed by the laboratory.

No individual children are identifiable by any outputs of this work. Children and parents were not provided with details of individual scores and results. The one exception to this rule was if an individual child was flagged by the Salimetrics laboratory as having exceptionally high or low levels of cortisol that might indicate significant physical pathology such as Cushing's Syndrome or Addison's Disease that left untreated could harm the child's health and development<sup>10</sup>. Across the three waves of data collection, there was only one instance of this happening and it transpired that the child was taking medication that contained a synthetic cortisol compound thereby skewing the cortisol data.

#### ***6.6.5 Ensuring the study has no damaging effects on participants***

Participation in this research requires students to complete questionnaires and collect saliva during two potentially stressful periods (KS2 SATs exams and the transition to secondary school). It is extremely unlikely that taking part in this research could have a damaging effect upon the participants. Straus (1981) observes that there is no empirical data supporting the suggestion that individuals experience psychological harm as a result of answering sensitive questions. In addition Hanrahan et al (2006) have noted that techniques for the collection of saliva have no harmful effects, physical or psychological, for participants. Nevertheless, participants were able to withdraw at any point and steps were taken to minimise the disruption to children's daily schedule. The ACAPI and paper

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<sup>10</sup> It was not deemed appropriate to replicate these procedures for psychological data. It is important to note that the SDQ is not a clinical diagnostic tool. It can indicate prevalence of psychopathology within a **population**, but in the absence of other data (such as triangulated SDQs from multiple respondents, ideally followed up by a clinical assessment conducted by a professional) a self-report score would not place enough confidence in the data to justify a breach of confidentiality at the individual child level. Conversely, cortisol is a much more direct indicator of pathology, and in the instance where the lab results indicated pathology, the researcher planned to recommend parents follow-up with their GP.

data collection tools were designed to be as brief as possible (taking no longer than 20-30 minutes).

## **6.7 DATA PREPARATION**

Prior to conducting analysis of the data using various techniques described below, the dataset was subject to several cleaning and screening procedures that included methods for dealing with outliers and also missing data. Comprehensive descriptive statistics for the measures were generated as part of these initial cleaning and screening exercises (these are available in Appendix VII - XI).

### **6.7.1 Outliers**

Outliers are extreme values on a variable that are unusually distant from the mean (McKillup, 2006). Usually outliers are problematic in that they skew distributions and distort the interpretation of data - particularly when measures of central tendency are to be calculated (Vogt, 2011). There are several methods for identifying outliers (see Tabachnick, 2009); some involve interpreting visual representations of the data in the form of graphs, charts and plots. Given the size of the dataset for the present study, outliers were detected by transforming each variable into standardised scores. Those with a z score in excess of 3.29 were defined as outliers, as recommended by Tabachnick (2009). Each outlier was individually checked to ensure that it was not an artefact of incorrect data entry or a failure to specify missing data values (99, 88) in SPSS. Genuine outliers were subject to transformation procedures - in other words they were replaced in the raw data set with the score of their nearest neighbour. Given the small size of the sample it was important to minimise missing data as far as possible, by transforming outlying cases in this way loss of data is minimised (Tabachnick, 2009). Across all four time points a total of 45 individual item scores were transformed. This included 5 outliers pertaining to self-report questionnaires, and 40 relating to cortisol variables.

Approximately 50% of the cortisol outliers were instances where the immunoassay results indicated that the cortisol levels were too high or too low to detect, in these instances scores were replaced with the raw score represented by the highest or lowest z score for that variable in the remaining sample.

### 6.7.2 Missing data and attrition

There are two types of missing data: wave-level and item-level. Wave-level missing data refers to instances where a participant has not provided any data at all at a particular time point (see table 3 for a summary). Of the 66 participating children, 64 (97%) provided questionnaire data at T1 and 64 children were present and completed the online questionnaire at T2. Attrition at T3 was relatively high; 43 (65%) children completed the paper-based questionnaire. At T4, 51 (77%) children completed the paper-based questionnaire. Of the 66 participating children 34 (51%) provided completed questionnaires at all four time-points.

**Table 3: Completion of questionnaires and cortisol sampling at each time point**

Time point	# completed self-reported questionnaires	% attrition in self-report questionnaires	# completed cortisol samples	% attrition in cortisol samples
T1	64	4	58	23
T2	64	4	61	8
T3	43	35	44	33
T4	51	23	N/A	N/A

In relation to the saliva samples, five children and their parents agreed to take part in the questionnaire aspect of the study but chose not to provide any saliva samples throughout the course of the study. At T1, a further three children either forgot to provide saliva samples or were unable to do so for various reasons such as they were ill or on holiday. At T2, five children were unable to provide saliva samples. Significant attrition was observed in relation to saliva samples at T3, at which time only 44 (67%) participants provided the samples. Of the 66 participating children 42 (64%) provided samples at all three time-points (cortisol was collected at T1, T2 and T3 only).

The most common reasons for attrition were that parents forgot to collect saliva on the days specified in their instructions, or they felt that they could not commit to the research during what they felt to be a very busy time for themselves and their children. In many of the latter instances, children and parents were re-engaged for participation at later data

collection time points. Attrition is noticeably high during the transition time point (T3); many parents reported that the changes in daily schedule and travel arrangements incurred by the transition meant that they found it very difficult to complete the saliva sampling at this time.

Item-level missing data refers to cases where a respondent has contributed data at the particular time point, but missed a tick box on a questionnaire, or failed to provide a saliva sample at one of the three allocated times during a day. Item level missing data is mainly an issue during instances where paper questionnaires were completed. The ACAP was designed in such a way that respondents could not move onto the next page unless all of the items were endorsed. The same controls are not in place when children complete their questionnaires on paper at home. Of those children who completed and returned paper-based questionnaire data at T3 and T4, there were 14 missing items across both time points. Of those children that provided saliva samples across all the time-points there were 161 items of missing data at the within-child level, either because samples were contaminated with blood or because children forgot to provide a specific sample, or because information recorded by parents in the cortisol diaries suggested that either the samples had been collected at the wrong time or the child had taken medication that could affect cortisol levels<sup>11</sup>.

There are several different ways that missing data can be dealt with. These techniques typically generate an estimate of what the value of the missing data might have been using the data that is available. Examples of missing data handling methods include single imputation, mean imputation, regression imputation, maximum likelihood and multiple imputation (Baraldi and Enders, 2010). There are certain conditions that must be met in order for these techniques to be reliable, for example many require substantial sample sizes and they all require that multivariate data is normally distributed (Field, 2009). Unfortunately the sample size within the present study is not large enough to implement any of these techniques with rigour and there are some variables for which the data is not

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<sup>11</sup> As described earlier in this chapter multiple cortisol measurements were taken in order to calculate an average score for awakening, post awakening and evening across all three days. For all of the children that provided samples there was sufficient data from at least one of the days to provide these scores and therefore no participants were lost on the basis of these exclusions.

normally distributed. As a result the deletion technique was deemed appropriate (Tabachnick, 2009).

There are two types of deletion techniques: listwise and pairwise. In listwise deletion, any cases with missing values are discarded from the dataset. The advantage of this approach is that it produces a complete data set, however, in studies with large numbers of variables sample sizes can be dramatically reduced and significance tests will therefore lack statistical power (Baraldi and Enders, 2010). With pairwise deletion, incomplete cases are deleted on an analysis-by-analysis basis, so that the data pertaining to a particular individual child might contribute to some analyses but not others. The latter pairwise approach has a much reduced impact on sample size compared to the listwise method (Baraldi and Enders, 2010). Thus the former has been selected for the current dataset because the sample size was relatively small to begin with

## **6.8 ANALYSIS STRATEGIES FOR TESTING HYPOTHESES**

The selection of statistical techniques with which to test the research hypotheses was dependent on whether the data collected for the present study met the four assumptions of parametric tests. The four assumptions are that (i) the data is normally distributed, (ii) that there is homogeneity of variance, (iii) data is measured at least at interval level, and finally (iv) that the data from different participants is independent and does not influence the data from another (Field, 2009). On the whole, parametric tests such as regression and analysis of variance (ANOVA) are viewed as more robust and reliable than non-parametric tests (Field, 2009; Tabachnick, 2009). However, in many instances the data collected for this study violated the assumption of normality – the distributions were skewed. Although techniques were applied to the data to rectify the problem, the data remained in some cases non-normally distributed (see appendix VII - XI for more detail). Thus, as recommended by Tabachnick (2009) and Field (2009) both parametric and non-parametric techniques were employed, where no differences between the tests were observed, the findings of the parametric tests are reported in *Chapter Six*. Where differences were observed, only the non-parametric tests are reported.

Each of the research questions and associated hypotheses were subjected to a specific analysis strategy and the analyses were conducted using the statistical software known as SPSS (Statistical Package for the Social Sciences).

### ***6.8.1 Testing hypothesis one***

**H<sub>1</sub>:** On average, there will be moderate increases in emotional and behavioural problems at exams and transition compared to baseline. Within this overall trend there will be individual variation: some children will experience an increase in difficulties, others will experience a decrease in difficulties and for some children their emotions and behaviour will remain stable.

Several different techniques were applied to the data to determine if there were any significant differences between the mean scores on the SDQ total difficulties, emotions and behaviour subscales at each time point. Standard error bar graphs were produced and interpreted and paired samples t tests (and non-parametric alternative the Wilcoxon signed ranks test for related samples) were conducted.

Many statistical texts highlight that in research such as this, where multiple comparisons are made between large numbers of variables the rate of type I error (or false positives) is likely to be high (Field, 2009; Tabachnick, 2009). The Bonferroni correction is an oft cited technique applied to data in order to reduce the type 1 error rate. It assumes that 1 in 20 tests will be statistically significant by chance alone and adjusts the critical p-value (significance level) accordingly (Field, 2009). However in doing so, the Bonferroni correction reduces the statistical power of the tests and simultaneously increases the risk of type II error (false negative). In line with recommendations set out in Perneger (1998), supported by Nakagawa (2004), and based on the small sample size of this study and the multiple comparisons required in the analyses, the decision was taken not to use the Bonferroni correction.

### ***6.8.2 Testing hypothesis two***

**H<sub>2</sub>:** Differences in cognitive appraisal will explain a proportion of the variation in children's emotions and behaviour. Positive appraisals, such as challenge and resources to cope, are expected to be associated with fewer emotional and behavioural difficulties.



Whereas negative appraisals such as threat and no resources to cope will be associated with greater difficulties.

Data obtained at the time of the SATs exams (T2) and at the time of the transition to secondary school (T3) was analysed separately using techniques founded on the principles of the general linear model (GLM). This technique assumes that there is a linear relationship between mental health difficulties and appraisal (e.g. the more threatening an appraisal is, the more mental health difficulties a child experiences or that for more challenging appraisals far fewer difficulties will be observed). Scatterplots were produced to explore whether there might be a linear association between appraisal variables (threat, challenge and resources) and mental health outcomes (emotions, behaviour and total difficulties). Correlational tests (both parametric - Pearson, and non-parametric - Spearman) were conducted to determine if the linear relationships were significant. In instances where the relationships were statistically significant, and as recommended in Field (2009), an initial regression model was created incorporating the relevant variables including baseline mental health difficulties as co-variables. The output was examined to determine which predictor variables substantially contribute to the model's ability to predict mental health difficulties. The analysis was then re-run with only those variables that had significant predictive value to determine how much of the variation in mental health outcomes following each stressor could be explained by differences in the types of appraisals the children had made.

### ***6.8.3 Testing hypothesis three***

**H<sub>3a</sub>:** The effects of appraisal will be partially mediated by the types of coping strategies that children deploy in the context of each stressor. Challenge and resources to cope appraisals will lead to the enactment of active strategies such as problem-solving and assistance seeking, which will in turn increase the chances of children experiencing fewer emotional and behavioural difficulties. Threat and low resources to cope on the other hand will be associated with passive and avoidant coping strategies that in turn increase the likelihood of children experiencing greater difficulties.

**H<sub>3b</sub>:** children will experience disruption to their HPA axis functioning during the exams and transition, as indicated by a detectable rise in the concentration of cortisol in their saliva

at mid-stressor timepoints (when compared to baseline pre-stressor levels)<sup>12</sup>. It is also hypothesised that a small proportion of children will display a 'dampened' cortisol response indicative of chronic stress<sup>13</sup>.

**H<sub>3c</sub>:** It is hypothesised that the relationship between appraisal and children's outcomes will be partially mediated by cortisol. Negative appraisals (threat and lack of resources) will be associated with higher levels of cortisol (at both awakening and during the day), that in turn increase the likelihood of children experiencing greater emotional and behavioural difficulties. Positive appraisals (challenge and resources to cope) on the other hand are likely to be associated with lower levels of cortisol (but not with a flattened/dampened pattern), which will in turn increase the chances of children experiencing fewer emotional and behavioural difficulties.

Regression equations are the recommended analytical procedure for statistically testing a mediator effect (Bennett (2000). Baron and Kenny (1986) proposed a four step approach to the analysis: a regression equation should test (1) whether the independent variable is a significant predictor of the outcome variable; (2) that the independent variable is a significant predictor of the mediator; and (3) the mediator is a significant predictor of the outcome variable (Bennett, 2000) (see Fig.9). If one or more of these relationships are non-significant, it is generally agreed that mediation is not possible (although some researchers have argued that this is not always the case; see MacKinnon et al., 2007). If significant relationships are observed in steps (1) - (3), the analysis should proceed to step (4) and all of the variables should be entered into a regression model together. Mediation is supported if the effect of the mediator on the outcomes variable remains significant after controlling for the independent variable. If the independent variable is no longer significant when the mediator is controlled, *full mediation* has been detected. If both the

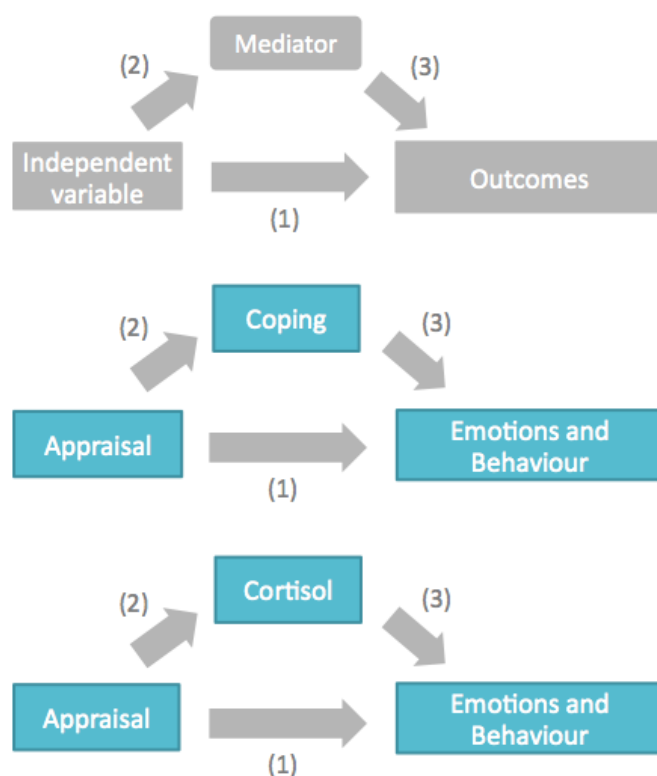
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<sup>12</sup> Conceptually, it is important to determine whether children are physiologically responsive to the routine stressors under study before it is possible to determine if the relationship between children's appraisals of those stressors and their emotional and behavioural difficulties are partially mediated by levels of the stress hormone cortisol.

<sup>13</sup> Generally speaking, the perception of a stressor will trigger the HPAA to produce more cortisol than usual in an effort to mobilise extra physical resources that might support adaptation to the stressor (Gaab et al., 2003; Guttman and Nemeroff, 2011). However, it has also been noted that cortisol does not have a linear relationship with outcomes, significantly lower cortisol levels (sometimes referred to as a 'flattened' or 'dampened' cortisol response) can be indicative of chronic stress arising from exposure to a multitude of stressors simultaneously or in short succession (Blair et al., 2011; Dallman and Hellhammer, 2011; Lovallo, 2011).

independent variable and mediator are still significant, the findings suggest *partial mediation*. Figure 9 illustrates that for this particular analysis cognitive appraisal is the independent variable; emotions, behaviour and total difficulties are the outcome variables; and coping strategies and cortisol are the mediator variables.

**Figure 9: Illustration of steps involved in mediation analysis**



### ***Coping***

Data obtained at the time of the KS2 exams (T2) and at the time of the transition to secondary school (T3) was analysed separately. The relationship between the independent variable (appraisal) and outcomes (emotions, behaviour and total difficulties) was already analysed in order to test H<sub>2</sub>. The relationships between appraisal and coping, and coping and outcomes were then analysed using the same techniques reported for H<sub>2</sub>. Thus, scatterplots were created to explore any linear relationships between the variables, followed by correlational analysis to determine if any patterns were significant and regression analyses determined how much variation could be explained. Finally, a multiple regression analyses was conducted to determine whether coping strategies mediated the relationship between appraisal and mental health

outcomes at each mid-stressor time point (T2 and T3). In all of the regression analyses, pre-stressor levels of emotions, behaviour and total difficulties were controlled for by entering baseline scores as co-variates.

### ***Cortisol***

In order to detect an increase in cortisol secretion that could be reasonably attributed to the stressors under study, cortisol data collected at a pre-stressor baseline (T1) was compared to the data collected at T2 and T3 time points. Paired samples t tests (and non-parametric Wilcoxon signed ranks test for related samples) were conducted to confirm whether there were significant differences in mean scores between pre-stressor baseline and mid-stressor time points. An increase in cortisol levels (either for the CAR or the full diurnal profile) from baseline to mid-stressor indicates that the physiological stress response systems of the children have been activated by the stressors under study.

However, it is important to note that cortisol does not have a linear relationship with stressors. Whilst higher levels of cortisol generally indicate physiological responsiveness to a stressor, a 'dampened' cortisol response (i.e. lower levels of cortisol at awakening and throughout the day) is often also an indication that a person is (chronically) stressed. This pattern usually indicates that a child has experienced a multitude of stressors either simultaneously or in short succession. Thus, additional thresholds were applied to the data in order to detect instances where participants experienced very low cortisol levels<sup>14</sup>. Those who experienced these low levels either at baseline (T1) or mid-stressor (T2 and T3) were separated from the remainder of the sample and analysed separately as a sub-group.

The cortisol data was subject to the same techniques as used in H<sub>3a</sub> to test for mediation effects. However, as has already been discussed, cortisol is not expected to have a linear relationship with appraisal and so those children who experienced no rise or a small rise (at either baseline or mid-stressor) were separated from the remainder of the sample and analysed separately using the same GLM techniques.

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<sup>14</sup> There is no consensus on the level at which these thresholds are set. Guidance outlined by Hauner et al. (2008) Ranjit et al. (2005) suggest setting the threshold according to values above, within or below one unit of standard deviation, or according to a tertile split. The latter strategy was utilised in this study.

#### ***6.8.4 Testing hypothesis four***

**H<sub>4</sub>:** Children will differ in the degree to which they display consistency in the types of appraisal they make in response to different stressors. Some children will display a challenge-oriented appraisal style (comprising consistent challenge and perceived resources to cope appraisals). Other children will demonstrate a threat-oriented appraisal style (comprising high levels of threat and low levels of perceived resources to cope). Other children will not be consistent in the types of appraisal they make

Descriptive reports were produced (using the thresholds set out in the 'measuring appraisal style' section earlier in this chapter) and cross tabs conducted to determine if any of the children's overall styles were consistent across each time point.

#### ***6.8.5 Testing hypothesis five***

**H<sub>5</sub>:** Children with a challenge-oriented appraisal style will have fewer emotional and behavioural difficulties than both children with a threat-oriented appraisal style and those children who do not display an appraisal style.

Graphs were produced to plot the differences in emotions, behaviour and cortisol between style groups at each time point and independent samples t tests (and non-parametric Mann-Whitney) were conducted to determine whether the differences were significant.

## CHAPTER 7: RESULTS

### 7.1 INTRODUCTION

This chapter presents the findings of the statistical analyses adopted to test the range of hypotheses described in *Chapter Six*. There are five sections representing each of the primary research questions, within each section the results of the analysis is reported and followed by a concise summary. A figure is also presented to illustrate which part of the hypothesised model of children's response to stress is being tested in each of the five sections section.

### 7.2 THE IMPACT OF ROUTINE STRESS ON CHILDREN'S EMOTIONS AND BEHAVIOUR

The paucity of research into the impact of routine stressors on children's emotions and behaviour was described in *Chapter Three*. There are a number of arguments to support the significance of these experiences as a risk to children's outcomes, not least the frequency with which children and adults report routine stressors as key shaping forces in their lives (Spirito, et al., 1991). This study examined the association between two specific examples of routine stress occurring within the school context (KS2 exams and the transition from primary to secondary school) and children's self-reported emotional and behavioural difficulties (see Fig.10). It was hypothesised that, on average, children would experience moderate increases in their emotional and behavioural difficulties at mid-stressor timepoints, but that there would be individual differences with some children displaying fewer difficulties and others remaining stable ( $H_1$ ).

**Figure 10: The relationship between stressors and outcomes**

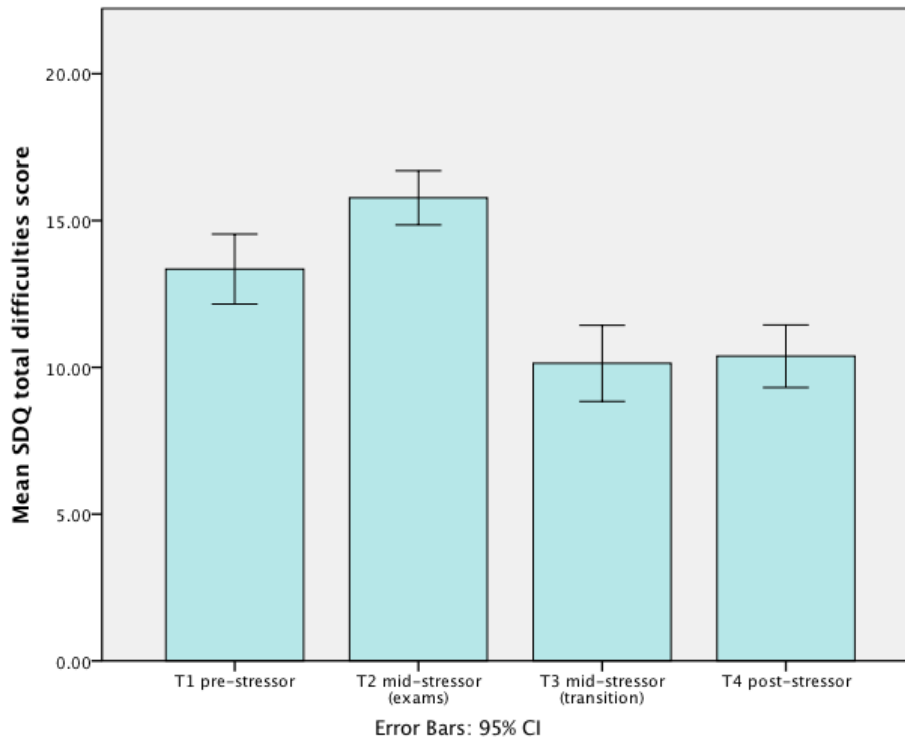


The first step in testing the hypothesis that exposure to a routine stressor impacts on children's emotions and behaviour (as measured by the total difficulties, emotions and conduct subscale of the SDQ) was to chart standard error graphs that plot mean scores and associated confidence intervals across each of the four data collection timepoints. As noted in Field (2009) methods of data collection can influence whether differences between means are detectable in standard error graphs. Repeated measures designs, such as the present study, have more power to detect differences because the error variance is substantially lower than is found in between-subjects data. The error variance is lower in repeated measures studies because extraneous factors such as IQ and gender are held constant as a result of the fact that the same children are measured at each time point (Field, 2009). Thus each graph (Figs. 11-13) has adjusted confidence intervals in recognition that the data presented are drawn from a repeated measures study.

Figure 11 reveals that there were differences between mean total difficulties scores at T1 (baseline) and at T2 (exams) and between scores at T1 (baseline) and T3 (transition). This suggests that as predicted, these two routine stressors (exams and transition) are associated with changes in children's mental health, although not always in the direction expected. Whilst children's mental health difficulties get worse during the exam period, they appear to improve during the transition to secondary school. Furthermore, there is very little difference in mean scores between T3 and T4, suggesting that the improvements children experience during the transition to secondary school are sustained for at least six months.

Related samples *t* tests were conducted to confirm whether the differences in children's scores between each time point are *statistically* significant. The results indicate that, when compared to pre-stressor baseline levels ( $M=13.28$ ,  $SD=6.3$ ), children's overall mental health was significantly worse ( $M=14.93$ ,  $SD=4.43$ ) during the exam period,  $t(59) = -2.55$ ,  $p = .01$ , and significantly improved ( $M=9.15$ ,  $SD=6.06$ ) during the transition,  $t(40) = 3.53$ ,  $p < .01$ .

**FIGURE 11: Mean scores on total difficulties at each time point**



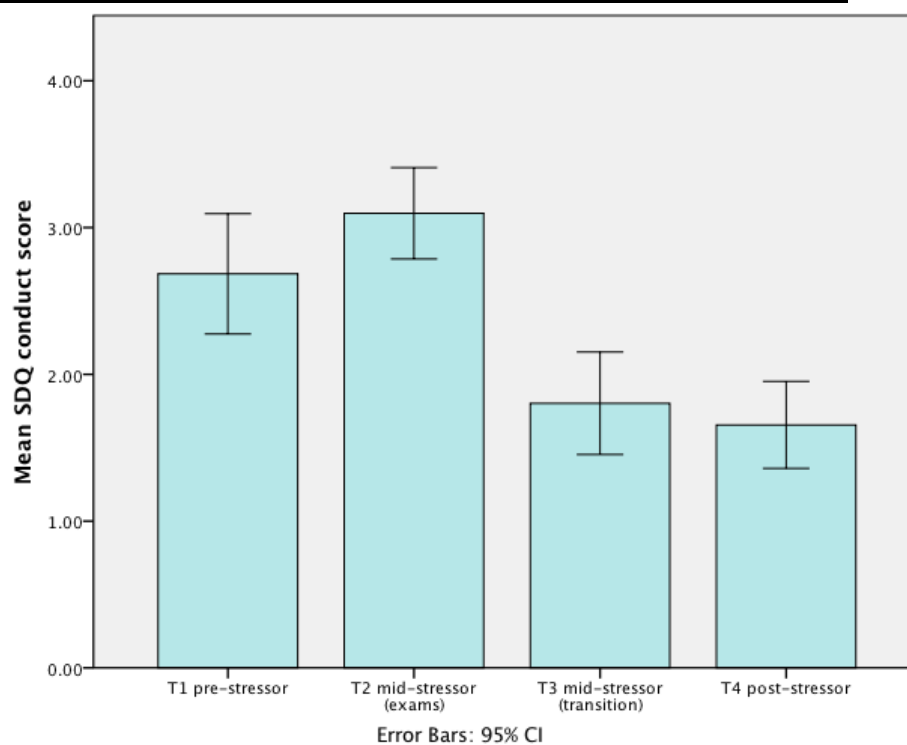
Similar patterns are detected in the data relating specifically to children's behaviour. For example Fig. 12 and Fig. 13 illustrate that compared to baseline behavioural outcomes worsen during the exams but are substantially improved during the transition and remain relatively stable at the six month follow-up.

The pattern of emotional difficulties was not consistent with the overall trends observed for total difficulties and behaviour. Emotional difficulties (see Fig. 13), were actually less marked during the exams than they are at the pre-stressor baseline and they continued to decrease at the transition whereupon they remained relatively stable through to the six month follow-up.

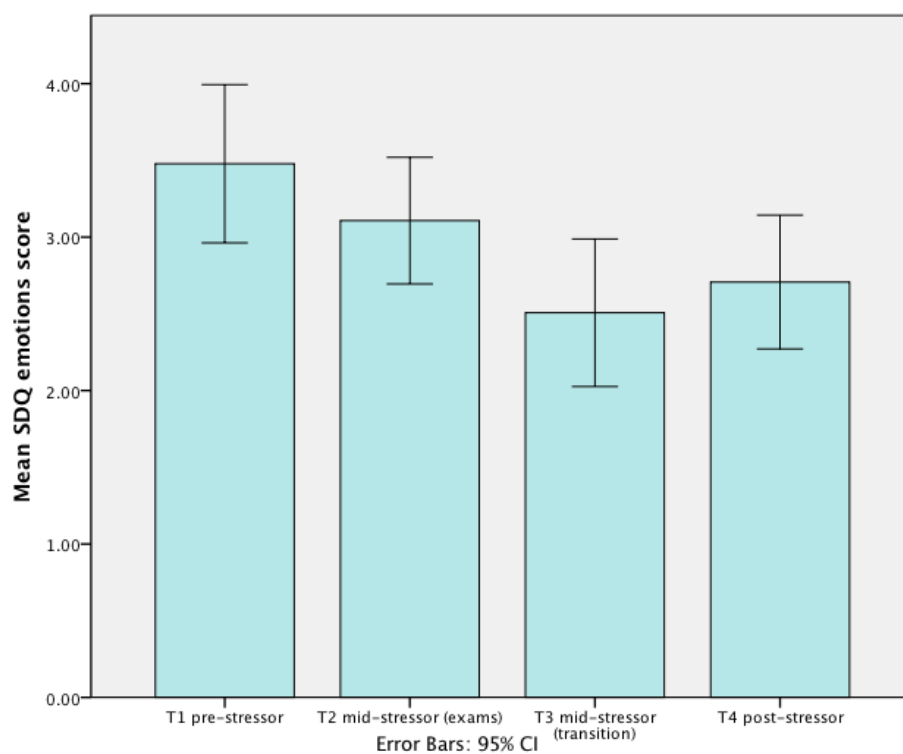
Once again, related samples *t* tests confirm that the differences in participants' scores between each time point were for the most part statistically significant. For conduct, the deterioration ( $M=2.84$ ,  $SD=1.38$ ) at T2 during the exams was not significant, but the improvement ( $M=1.56$ ,  $SD=1.32$ ) at T3 during the transition, when compared to baseline ( $M=2.53$ ,  $SD=1.69$ ), was statistically significant  $t(41)=3.81$ ,  $p<.01$ . For emotions, the improvements ( $M=2.84$ ,  $SD=2.38$ ) at T2 and T3 ( $M=2.56$ ,  $SD=2.5$ ) compared to baseline ( $M=3.45$ ,  $SD=2.53$ ) were statistically significant,  $t(60)=2.58$ ,  $p=.01$  and  $t(41)=2.33$ ,  $p<.05$  respectively.



**FIGURE 12: Mean scores on conduct problems at each time point**



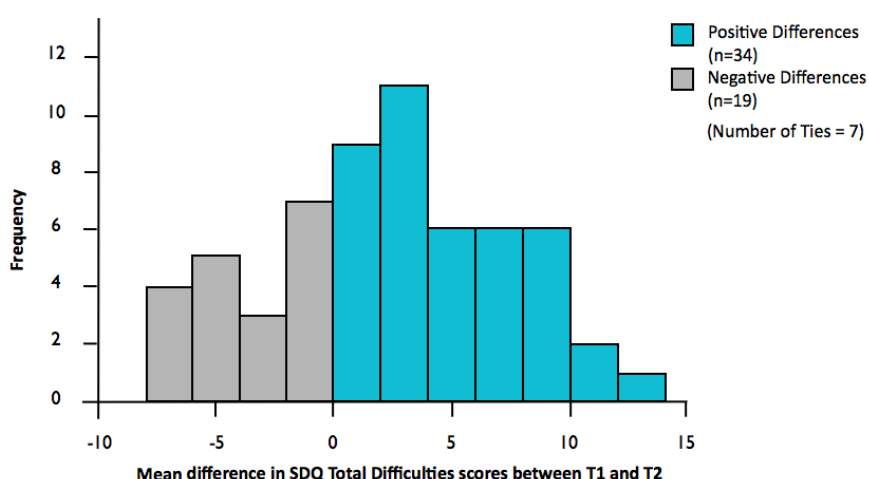
**FIGURE 13: Mean scores on emotional difficulties at each time point**



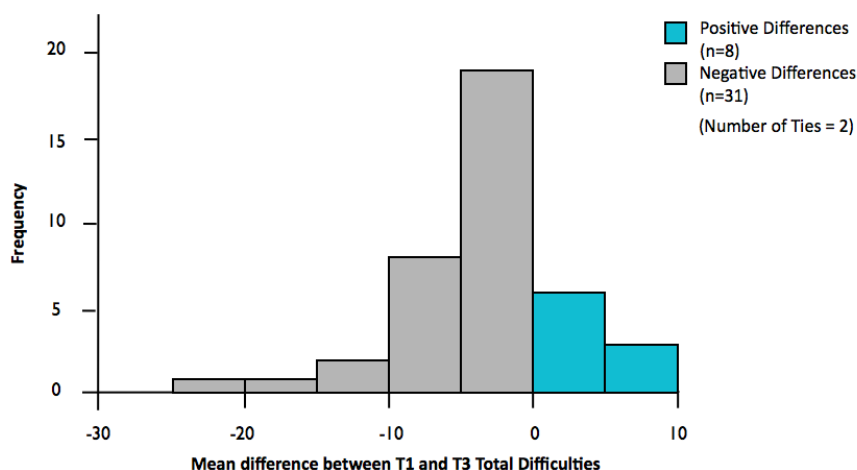
Whilst these data map overall trends in wellbeing for the sample of children under study, individual differences have also been observed; Fig. 14 and Fig. 15 reveal that some children did better, some worse and some remained the same following exposure to a particular stressor.

Fig. 14 reveals that although the mental health of seven children did not change during the exam period, 34 children reported higher scores on the total difficulties scale meaning that their mental health deteriorated (see the blue positive differences bars), and 19 children scores were lower indicating that their mental health improved (see the grey negative differences bars). Conversely, Fig. 15 reveals that during the transition to secondary school, the large majority of children (31) experienced improved mental health, and smaller proportions remained the same (2) or suffered deterioration in mental health (8). The next section of this chapter tests hypotheses about some of the processes that might explain this variation.

**FIGURE 14: Individual variation in outcomes (total difficulties) between T1 and T2 (exams)**



**FIGURE 15: Individual variation in outcomes (total difficulties) between T1 to T3 (transition)**



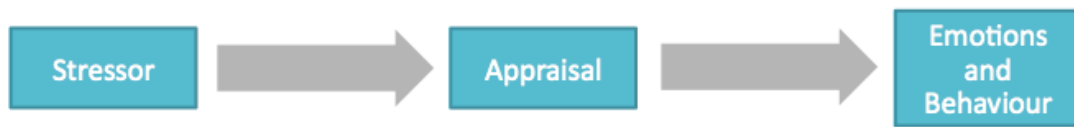
### ***7.2.1 Summary of findings in relation to Q1:***

It is important to note, that in the absence of a control group (i.e. a group of children who neither experience exams nor transition) a definitive statement that routine stressors cause changes in children's mental health cannot be made. However the results do indicate that these stressors are *associated* with changes in mental health. On average, there were moderate increases in total mental health difficulties and conduct at the time of the SATs exams, whereas conversely (and contrary to expectations) there were positive increases in both outcomes during the transition to secondary school. Regardless of overall trends, there are significant individual differences in children's psychological outcomes - some do worse, some better and some remain stable in the face of routine stress.

## **7.3 THE ROLE OF APPRAISAL IN ACCOUNTING FOR VARIATION IN CHILDREN'S OUTCOMES**

Having established that routine stressors appear to be associated with an emotional and behavioural response, the analyses turned to the role of appraisal in explaining individual differences (see Fig. 16).

**FIGURE 16: Appraisal as a mediator of the relationship between stressors and outcomes**



It was hypothesized that differences in cognitive appraisal would explain variation in children's psychological outcomes. Positive appraisals, such as challenge and resources to cope, were expected to be associated with better emotions and behaviour. Whereas negative appraisals, such as threat and no resources to cope, would be associated with poorer emotions and behaviour H<sub>2</sub>.

The basic assumption that there is a relationship between appraisals and outcomes was explored using scatterplots (see Appendix XI). The scatterplots indicated that there were linear relationships, to varying degrees, between the appraisal variables and mental health outcomes (total difficulties). Although many of the scatter graphs revealed linear trends in the data, individual scores tended to be spread widely across the plots. This suggests that although there were meaningful relationships between appraisal and outcomes, the associations are relatively weak.

Correlation analyses were conducted to determine the nature and strength of the relationship between appraisal and outcomes. The size of these correlations can be described as ranging from moderate to large suggesting that there was a strong relationship between the two variables. During the exam period (T2) higher scores on the SAMA threat subscale were significantly associated with higher scores on the SDQ total difficulties subscale,  $r(59) = .52$ ,  $p < .01$ , emotions subscale,  $r(59) = .49$ ,  $p < .01$  and conduct subscale  $r(59) = .37$ ,  $p < .01$ . Conversely, higher scores on the challenge scale were associated with lower scores on the total difficulties scale,  $r(61) = -.29$ ,  $p = .05$  and the emotions subscale,  $r(61) = -.33$ ,  $p < .01$ . The association between an appraisal of resources to cope and total difficulties at this time point was significant,  $r(62) = -.21$ ,  $p = .05$ , higher scores on resources to cope signified lower scores on total difficulties. Resources to cope was not significantly related to either emotions or behaviour at this

time point. This would suggest that the significant findings in relation to the total difficulties subscale, as a measure of global functioning, was driven not by emotions or behaviour but by other constructs measured by the Strengths and Difficulties Questionnaire, such as hyperactivity or peer relationships.

During the transition period (T3), similar patterns were observed both in terms of the size (two of the correlations could be described as large and the remainder moderate in size) and level of statistical significance. Elevated challenge scores were associated with fewer total difficulties,  $r(43) = -.63, p < .01$ , as were higher scores on the resources to cope scale,  $r(44) = -.48, p < .01$ . Challenge and resources were also significantly correlated with emotions  $r(44) = -.52, p < .01$ ,  $r(44) = -.27, p < .05$ ; and conduct  $r(44) = -.42, p < .01$ ,  $r(44) = -.29, p < .05$ . However there was no significant association between threat appraisals and scores on total difficulties, emotions or behaviour at this time point.

In summary, the variables that significantly correlated with mental health at T2 (exams) were threat and challenge (and not resources to cope). At T3 (transition) only challenge and resources to cope correlated with outcomes. The general directions between each pair of variables specified in the hypothesis were supported by the data, i.e. greater threat was associated with poorer outcomes, greater challenge was associated with better outcomes, and fewer resources to cope were linked to worse outcomes. The strength of the relationships varied between (for the most part) moderate and large in size ( $r = .21$  to  $r = .52$ ).

Multiple regression analyses were performed to determine how much variation in each measure of mental health outcome could be predicted by threat, challenge and resources to cope appraisals. In accordance with the analysis strategy set out in *Chapter Six*, appraisal variables (threat and challenge at T2; challenge and resources at T3) were regressed against outcomes (SDQ total difficulties, emotions and behaviour), to determine whether the appraisal variables had significant predictive value at each time point. Baseline (T1) scores on the SDQ were entered as a co-variate at T2 (exams) and T2 scores were entered as co-variables at T3 (transition).

### 7.3.2 The relationship between appraisal and outcomes at T2

At T2 the resulting model significantly predicted total difficulties ( $F(1,54) = 12.67, p < .01, R^2 = .43$ ), however the only predictors that made a statistically significant contribution to the model at T2 were threat ( $t = 2.22, p < .05$ ) and baseline total difficulties scores ( $t = 3.78, p < .01$ ). Table 4 displays the unstandardized regression coefficients, intercept, and standardised regression coefficients for each predictor.

**TABLE 4: Threat and challenge regressed against total difficulties at T2 (controlling for baseline total difficulties)**

	<b>B</b>	<b>SE B</b>	<b><math>\beta</math></b>
<b>Constant</b>	8.32	2.27	
<b>Threat</b>	1.89	0.85*	0.28
<b>Challenge</b>	-0.02	0.59	0.004
<b>T1 Total Difficulties</b>	0.34	0.09**	0.48

Note \*  $p < .05$ , \*\*  $p < .01$ .

Challenge was not a significant predictor of mental health outcomes during the exam period (T2), (although earlier analyses indicated statistically significant correlations between challenge and outcomes at this timepoint, this finding is perhaps not surprising given the size of those correlation was small-to-moderate at best). As per the analysis strategy outlined in *Chapter Six* a further regression analysis was conducted with only threat entered into the model (see Table 5). This results revealed that after controlling for baseline total difficulties scores (explaining 38% of the variance), differences in threat appraisals accounted for 5% of the variation in children's mental health outcomes ( $F(1,54) = 19.38, p < .01, R^2 = .43$ ).

**TABLE 5: Threat regressed against total difficulties at T2 (controlling for baseline total difficulties)**

	<b>B</b>	<b>SE B</b>	<b>β</b>
<b>Constant</b>	8.26	1.20	
<b>Threat</b>	1.90	0.81*	0.27
<b>T1 Total Difficulties</b>	0.34	0.09**	0.47

Note \*  $p < .05$ , \*\*  $p < .01$ .

### ***7.3.3 The relationship between appraisal and outcomes at T3***

At T3 during the transition to secondary school, the initial model comprising challenge, resources and T2 total difficulties also significantly predicted outcomes ( $F(1,40) = 22.60$ ,  $p < .01$ ,  $R^2 = .65$ ). However, only two predictors were statistically significant: challenge ( $t = -3.27$ ,  $p < .01$ ) and T2 total difficulties ( $t = 5.35$ ,  $p < .01$ ). Table 6 displays the unstandardized regression coefficients, intercept, and standardised regression coefficients for each appraisal variable. A further regression analysis (see Table 7) revealed that when controlling for T2 total difficulties scores (explaining 44% of the variance), challenge appraisals accounted for 21% of the variation in outcomes ( $F(1,40) = 34.81$ ,  $p < .01$ ,  $R^2 = .65$ ).

**TABLE 6: Challenge and resources to cope regressed against total difficulties at T3 (controlling for T2 total difficulties)**

	<b>B</b>	<b>SE B</b>	<b>β</b>
<b>Constant</b>	8.31	3.78	
<b>Challenge</b>	-3.27	1.00**	-0.47
<b>Resources</b>	-0.11	1.18	-0.01
<b>T2 Total Difficulties</b>	0.71	0.13**	0.54

Note \*  $p < .05$ , \*\*  $p < .01$ .

**TABLE 7: Challenge regressed against total difficulties at T3 (controlling for T2 total difficulties)**

	<b>B</b>	<b>SE B</b>	<b>β</b>
<b>Constant</b>	8.11	3.18	
<b>Challenge</b>	-3.34	0.70**	-0.48
<b>T2 Total Difficulties</b>	0.71	0.13**	0.54

*Note* \*  $p < .05$ , \*\*  $p < .01$ .

These findings all relate to scores on the total difficulties subscale of the SDQ. However, similar results were obtained when the analyses drilled down to the level of emotions and behaviour.

During the exam period (T2), and when controlling for T1 emotion scores, threat was the only significant predictor of both emotions ( $F(1,58) = 19.36, p < .01, R^2 = .42$ ) and conduct ( $F(1,58) = 5.37, p < .01, R^2 = .17$ ). Threat appraisals explained 6% of the variation in emotions and 12% of the variation in conduct during the exam period (T2) over and above baseline emotion and behaviour scores (explaining 46% and 5 % respectively).

At the transition to secondary school (T3), and after controlling for T2 emotion scores, challenge was the only significant predictor of emotions ( $F(1,40) = 39.89, p < .01, R^2 = .68$ ). Baseline levels of emotional difficulties accounted for 54% and challenge explains 14% of the variation at T3. Similarly, challenge was the only significantly predictor of conduct outcomes at the time of transition ( $F(1,40) = 7.95, p < .01, R^2 = .30$ ), explaining 10% of the variation (baseline conduct scores explain 20%).

#### ***7.3.4 Summary of findings in relation to Q2:***

The patterns between appraisal and psychological outcomes specified in H<sub>2</sub> were largely supported by the data. Positive types of appraisal (as represented by higher scores on challenge and resources subscales) were associated with fewer emotional, behavioural and general mental health difficulties. Negative appraisals i.e. those low on resources and high on threat were associated with greater behavioural, emotional and total mental health problems.

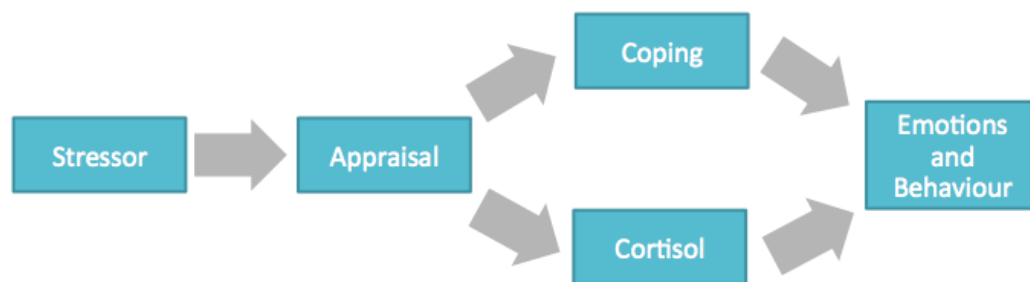


However, regression models indicated that there was a degree of specificity in relation to the types of appraisal that have predictive value in the context of different stressors. During the exam period (T2) threat was the only significant predictor of outcomes and it accounted for 5% of the variation in total difficulties, 6% of the variance in emotions and 12% of the variation in conduct. In contrast, challenge was the only significant predictor of outcomes during the transition period, explaining 21% of the variance in total difficulties and 14% of the variation in emotional outcomes and 10% of the variation in conduct outcomes.

#### **7.4 THE RELATIONSHIP BETWEEN APPRAISAL, COPING AND CORTISOL**

In many psychological theories of stress, the appraisal process is conceptually linked to other stress response processes; appraisal is described as the 'organiser' of the stress response. Thus it was hypothesized that the effects of appraisal will be partially mediated by the types of coping strategies that children deploy in the context of each stressor as well as their cortisol responsivity (see Fig.17).

**FIGURE 17: Appraisal as an organiser of coping and cortisol**



##### ***7.4.1 Appraisal and coping***

It was hypothesised that challenge and resources to cope appraisals will lead to the enactment of approach strategies such as problem-solving and assistance seeking, which will in turn increase the chances of children experiencing fewer difficulties. Threat and low resources to cope on the other hand will be associated with avoidant coping strategies that in turn increase the likelihood of children experiencing greater difficulties (H<sub>3a</sub>).

Scatterplots were produced for each pair of appraisal and coping variables to explore whether there were any linear relationships that warrant further analysis via correlation and regression techniques. These graphs are too numerous to be included in the results chapter of this thesis but can be accessed in Appendix XII. They indicate that several linear relationships exist between appraisal and coping.

At T2, and as demonstrated in Table 8, correlational analyses revealed that there were small to moderate (and in one case large), statistically significant associations between all of the appraisal variables and several of the coping strategies under study. Threat had significant relationships with assistance seeking, cognitive avoidance and behavioural avoidance but not problem solving. Challenge, on the other hand, had significant relationships with problem solving, cognitive avoidance and behavioural avoidance but not assistance seeking. Finally the resources to cope scores were significantly correlated with assistance seeking, problem solving and behavioural avoidance, but not cognitive avoidance.

**TABLE 8: Correlational analyses of appraisal and coping at T2**

	Assistance seeking	Problem solving	Cognitive avoidance	Behavioural avoidance
<b>Threat</b>	.36**	0.12	.40**	.53**
<b>Challenge</b>	0.03	.30**	-.38**	-.28**
<b>Resources</b>	.27*	.35**	-0.17	-.25*

*Note* \*  $p < .05$ , \*\*  $p < .01$

During the transition period at T3 (see Table9), challenge appraisals were for the most part not significantly correlated with coping strategies, with the exception of cognitive avoidance. Similarly, resources to cope was significantly correlated with assistance seeking and cognitive avoidance only and the correlations are small in size. However, threat appraisals had moderate and significant relationships with all of the coping strategies, assistance seeking, problem solving, cognitive avoidance and behavioural avoidance.

**TABLE 9: Correlational analysis of appraisal and coping at T3**

	Assistance seeking	Problem solving	Cognitive avoidance	Behavioural avoidance
<b>Threat</b>	.36**	.37**	.29*	.28*
<b>Challenge</b>	0.01	0.13	-.43**	-0.19
<b>Resources</b>	.23*	0.22	rs-.13*	-0.07

Note \*  $p < .05$ , \*\*  $p < .01$  rs = spearman correlation

At both timepoints, the relationship between threat and active coping strategies was not as expected. It was hypothesised that negative appraisals would indicate greater use of passive avoidant strategies and less use of active strategies; however these data reveal that threat appraisals were positively associated with *both* forms of coping. Challenge and resources to cope, on the other hand, were correlated with coping strategies in the directions expected - positively correlated with active strategies and negatively correlated with passive strategies.

Regression analyses were conducted to determine how much variation in a particular coping strategy was predicted by each of the appraisal variables. The results are summarised in Tables 10 and 11 which contains the unstandardized regression coefficients, intercept, and standardised regression coefficients for each predictor (appraisal) and dependent variable (coping strategy).

#### ***7.4.2 Appraisal and coping at T2 (exam period)***

##### Threat, challenge, resources x assistance seeking

Overall, cognitive appraisal was a significant predictor of assistance seeking coping strategies<sup>15</sup>. In terms of the individual appraisal dimensions, threat<sup>16</sup> and resources to cope<sup>17</sup> were useful predictors but no significant effects were found for challenge<sup>18</sup>.

<sup>15</sup>  $F(1,57) = 8.41, p < .01, R^2 .32$

<sup>16</sup>  $t = 3.71, p < .01$

<sup>17</sup>  $t = 2.57, p = .01$

<sup>18</sup>  $t = 3.75, p = .71$

### Threat, challenge, resources x problem solving

Overall, cognitive appraisal was a significant predictor of problem solving coping strategies<sup>19</sup>. Specifically, threat<sup>20</sup> was a useful predictor but no significant predictive value was associated with either challenge<sup>21</sup> or resources<sup>22</sup>.

### Threat, challenge, resources x cognitive avoidance

Appraisal did predict usage of cognitive avoidance coping strategies<sup>23</sup>, however of the three appraisal dimensions, only threat<sup>24</sup> was a significant predictor<sup>25</sup>.

### Threat, challenge resources x behavioural avoidance

At time 2, appraisal significantly predicts behavioural avoidance<sup>26</sup>, however of the three appraisal dimensions only threat was a significant predictor<sup>27</sup> as opposed to challenge<sup>28</sup> and resources<sup>29</sup>.

**TABLE 10: Appraisal regressed against coping at T2**

T2	Assistance Seeking			Problem Solving			Cognitive Avoidance			Behavioural Avoidance		
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
<b>Constant</b>	0.34	0.21		0.08	0.34		0.99	0.31		0.20	0.24	
<b>Threat</b>	0.33	0.09**	0.46	0.28	0.14*	0.26	0.32	0.13*	0.33	0.40	0.09*	0.50
<b>Challenge</b>	0.03	0.08	0.06	0.19	0.12	0.28	-0.09	0.11	-0.13	0.02	0.08	0.03
<b>Resources</b>	0.17	0.07**	0.38	0.15	0.10	0.23	-0.03	0.10	-0.27	-0.09	0.07	-0.18

Note \*  $p < 0.05$ , \*\*  $p < 0.01$

<sup>19</sup>  $F(1,57) = 4.28$ ,  $p < .01$ ,  $R^2 = .19$

<sup>20</sup>  $t = 1.95$ ,  $p = .05$

<sup>21</sup>  $t = 1.68$ ,  $p = .10$

<sup>22</sup>  $t = 1.49$ ,  $p = .14$

<sup>23</sup>  $F(1,57) = 3.87$ ,  $p = .01$ ,  $R^2 = .17$

<sup>24</sup>  $t = 2.38$ ,  $p = .02$

<sup>25</sup> challenge  $t = -.78$ ,  $p = .45$ ; resources  $t = -.27$ ,  $p = .79$

<sup>26</sup>  $F(1,58) = 7.54$ ,  $p < .01$ ,  $R^2 = .29$

<sup>27</sup>  $t = 4.03$ ,  $p < .01$

<sup>28</sup>  $t = .20$ ,  $p = .85$

<sup>29</sup>  $t = -1.26$ ,  $p = .22$

### ***7.4.3 Appraisal and coping at T3 (transition to secondary school)***

#### Threat, challenge, resources x assistance seeking

As expected appraisal predicted assistance seeking strategies at T3<sup>30</sup>. Threat<sup>31</sup> and resources<sup>32</sup> were significant predictors where challenge is not<sup>33</sup>.

#### Threat, challenge, resources x problem solving

Appraisal was also a good predictor of problem solving strategies at time 3<sup>34</sup> although the only significant predictor was threat<sup>35</sup>.

#### Threat, challenge, resources x cognitive avoidance

Again, appraisal was a good predictor of cognitive avoidance<sup>36</sup> although challenge was the only significant predictor<sup>37</sup> threat<sup>38</sup> and resources<sup>39</sup> are non-significant.

#### Threat, challenge resources x behavioural avoidance

Finally, at time 3, none of the three appraisal variables significantly predicted behavioural avoidance<sup>40</sup>.

The findings of the regression analyses reported above indicate that cognitive appraisal was a significant predictor of different coping strategies in the context of both exams (T2) and transition (T3). However, the dimensions of appraisal with greatest predictive value varied according to type of coping strategy in question and the stressor context in which it was deployed.

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<sup>30</sup>  $F(3,38) = 5.35, p < .01, R^2 = .30$

<sup>31</sup>  $t = 2.37, p = .02$

<sup>32</sup>  $t = 2.90, p < .01$

<sup>33</sup>  $t = -1.62, p = .11$

<sup>34</sup>  $F(3,38) = 4.03, p = .02, R^2 = .27$

<sup>35</sup>  $t = .29, p < .01$

<sup>36</sup>  $F(2,36) = 4.00, p = .02, R^2 = .26$

<sup>37</sup>  $t = -2.77, p < .01$

<sup>38</sup>  $t = 1.57, p = .13$

<sup>39</sup>  $t = 1.23, p = .23$

<sup>40</sup>  $F(3,38) = 1.86, p = .15, R^2 = .13$

**TABLE 11: Appraisal regressed against coping at T3**

T3	Assistance Seeking			Problem Solving			Cognitive Avoidance			Behavioural Avoidance		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
<b>Constant</b>	0.14	0.51		-1.12	0.74		0.77	0.47		-0.08	0.20	
<b>Threat</b>	0.35	0.15*	0.33	0.52	0.19**	0.42	0.19	0.12	0.23	0.09	0.06	0.24
<b>Challenge</b>	-0.28	0.17	-0.32	0.05	0.20	0.05	-0.38	0.14**	-0.53	-0.10	0.07	-0.32
<b>Resources</b>	0.59	0.20**	-0.57	0.42	0.26	0.32	0.21	0.17	0.23	0.09	0.08	0.25

Note \*  $p < 0.05$ , \*\*  $p < 0.01$

#### **7.4.4 Coping and mental health**

Multiple regression was conducted to determine whether coping strategies could predict mental health outcomes at each time point (after controlling for baseline levels of mental health). For the most part coping strategies were not useful predictors of total difficulties, with the exception of assistance seeking at T2 ( $F(1,55) = 21.02$ ,  $p < .01$ ,  $R^2 = .44$ ), which explained 5% of the variance over and above that explained by baseline levels of mental health difficulties. However, none of the coping strategies significantly predicted either emotions or conduct, suggesting in this instance that assistance seeking coping strategies were influencing a different dimension of mental health such as peer relationships or hyperactivity.

At T3 cognitive avoidance was a significant predictor of total difficulties, explaining 4% of the variance ( $F(3,39) = 19.32$ ,  $p = .05$ ,  $R^2 = .51$ ). Cognitive avoidance was also a significant predictor of conduct problems, explaining 8% of the variance ( $F(3,39) = 7.01$ ,  $p < .01$ ,  $R^2 = .28$ ). In both cases baseline levels of total difficulties and conduct explained much larger amounts of variation (47% and 20% respectively). None of the remaining coping strategies were significant predictors of total difficulties, conduct or emotions.

#### 7.4.5 Testing for mediation

The predictive capacity of coping strategies was dramatically reduced when controlling for baseline mental health difficulties and relevant appraisal variables at each time point (earlier analyses revealed that only threat was a significant predictor of outcomes at T2, whereas only challenge is a significant predictor at T3), to the extent that copings strategies no longer had a significant predictive value (see Tables 12, 13 and 14). Thus, the relationship between cognitive appraisal and children's mental health outcomes in the context of routine stressors was not mediated by the coping strategies they enact.

**TABLE 12: Assistance seeking regressed against total difficulties at T2 (controlling for threat and T1 total difficulties)**

	<b>B</b>	<b>SE B</b>	<b>β</b>
<b>Constant</b>	6.01	1.65	
<b>T1 Total Difficulties</b>	0.38	0.09**	0.53
<b>Assistance Seeking</b>	2.00	1.14	0.20
<b>Threat</b>	1.22	0.89	0.18

$F(1,55) = 15.75, p < .01, R^2 = .48$

Note \*  $p < .05$ , \*\*  $p < .01$ .

**TABLE 13: Cognitive avoidance regressed against total difficulties at T3 (controlling for challenge and T2 total difficulties)**

	<b>B</b>	<b>SE B</b>	<b>β</b>
<b>Constant</b>	7.55	3.68	
<b>T2 Total Difficulties</b>	0.67	0.14**	0.53
<b>Cognitive avoidance</b>	1.13	1.22	0.11
<b>Challenge</b>	-3.22	0.86**	-0.42

$F(3,39) = 20.80, p < .01, R^2 = .64$

Note \*  $p < .05$ , \*\*  $p < .01$ .

**TABLE 14: Cognitive avoidance regressed against conduct problems at T3 (controlling for challenge and T2 conduct problems)**

	<b>B</b>	<b>SE B</b>	<b>β</b>
<b>Constant</b>	2.16	1.02	
<b>T2 Conduct problems</b>	0.25	0.14*	0.27
<b>Cognitive avoidance</b>	0.53	0.39	0.21
<b>Challenge</b>	-0.58	0.27*	-0.32
F (3,38) = 6.50, p < .01, R <sup>2</sup> = .36			

Note \* p < .05, \*\* p < .01.

#### **7.4.6 Interim summary of coping findings in relation to Q3**

The findings reported here suggest that there was a relationship between appraisal and coping, but that the relationship is more complex than was predicted in H<sub>3</sub>. Whilst positive appraisals such as challenge and resources to cope were positively correlated with approach strategies, threat was positively correlated with both avoidant and approach coping strategies. Furthermore, although there was variation in psychological outcomes amongst the children in the sample, coping strategies add little predictive value over and above the variation explained by the cognitive appraisal process.

#### **7.4.7 Appraisal and cortisol**

Appraisal is described in many respects as the ‘organiser’ of the stress response. Thus it was hypothesized that the effects of appraisal will be partially mediated by physiological stress response processes, as measured in this study through the use of cortisol as a biomarker of the HPA axis (see Fig.17).

#### **7.4.8 Cortisol responsivity to routine stress**

As noted in *Chapter Four*, children have stable individual differences in relation to the way their bodies regulate cortisol and it is important to control for those differences in order to detect whether the body is doing anything over and above regular functioning in the context of a stressor. In this study, cortisol values obtained at a pre-stressor baseline and at mid-stressor points were compared to determine whether there were any



significant differences that might suggest that the HPAA was sensitive to the two routine stressors in question (exams and transition).

It was hypothesized that children will experience disrupted functioning during the exams and transition, as indicated by a detectable rise in the concentration of cortisol in their saliva at stressor timepoints when compared to baseline pre-stressor levels (H<sub>3b</sub>).

**TABLE 15: Mean scores on cortisol measures at each time point**

<b>CORT measure</b>	<b>T1 PRE-STRESSOR (Mean ug/dl and standard deviation)</b>	<b>T2 EXAMS (Mean ug/dl and standard deviation)</b>	<b>T3 TRANSITION (Mean ug/dl and standard deviation)</b>
<b>Cortisol awakening response</b>			
CARAUCg	.19 (.05)	.19 (.05)	.21 (.06)
CARAUCi	.05 (.03)	.05 (.03)	.04 (.04)
<b>Diurnal cortisol profile</b>			
FULLAUCg	204.22 (60.04)	204.39 (62.76)	214.19 (70.82)
FULLAUCi	-22.34 (61.99)	-24.83 (59.82)	-54.11 (99.45)

According to Table 15, mean values and standard deviations of all four of the cortisol measures (see *Chapter Six* for a description of these measures) remain relatively stable across T1 and T2. However at T3 there was an increase in cortisol according to one measure of the awakening response (CARAUCg) and both of the measures of total daily output (FULLAUCg and FULLAUCi). Despite this upwards trend towards T3, related samples t tests indicate that there were no statistically significant differences between mean cortisol levels on any of the summary measures between pre-stressor baseline (T1) and mid-stressor timepoints (T2 and T3). These findings suggest the exams and transition did not provoke a marked physiological response in children.

However, there are increasingly larger numbers of children, over time, who experienced a smaller than expected awakening cortisol response (see Table 16); as discussed in *Chapter Four* previous research has suggested that in addition to increases in cortisol

output, lower levels of cortisol can indicate disrupted functioning arising from exposure to chronic or multiple stressors. Children whose mean cortisol increase between awakening and post-awakening samples was lower than 0 ug/dl are categorised as having 'no rise' or a flat awakening response. Those whose cortisol values reached 0.09 ug/dl or less were categorised as having a small increase in cortisol - a sharp rise in secreted cortisol is expected post awakening in healthy samples. Of the 16 with a small rise at T3 during the transition, 11 children did in fact display a flat cortisol response. This would suggest that these children were chronically stressed, perhaps due to the experience of a multitude of stressors simultaneously, or in short succession. These findings might also indicate non-adherence to the cortisol data collection protocol but there was no indication of this in the corresponding cortisol diaries.

**TABLE 16: The number of children displaying either a 'no rise' or 'small rise' cortisol profile at each time point**

TIMEPOINT	No rise (lowest - 0 ug/dl)	Small rise (lowest 0 - 0.09 ug/dl)
T1 PRE-STRESSOR	0	10
T2 EXAMS	0	12
T3 TRANSITION	11	16

#### ***7.4.9 Appraisal and cortisol***

It was further hypothesized that negative appraisals (threat and lack of resources) would be associated with higher levels of cortisol (at both awakening and during the day) as well as with a flattened pattern of cortisol secretion. Positive appraisals on the other hand are likely to be associated with lower levels of cortisol (both at awakening and during the day) but not with a flattened pattern (H<sub>3</sub>).

There were some significant correlations between appraisal variables and different cortisol measures (see Tables 17 and 18). At T2 during the exams, challenge and resources were significantly correlated with both the CARAUCi and FULLAUCi (see Table 17).

**TABLE 17: Correlational analyses of appraisal and cortisol at T2**

	SAMA threat	SAMA challenge	SAMA resources
<b>CARAUCg</b>	0.12	0.04	0.32*
<b>CARAUCi</b>	0.10	-0.30*	-0.18
<b>FULLAUCg</b>	15	-0.08	0.22
<b>FULLAUCi</b>	0.08	-0.39*	-0.35*

*Note* \*  $p < .05$ , \*\*  $p < .01$

At T3 however only threat and resources correlated with cortisol. During the transition, threat was moderately and negatively correlated with measures of both the awakening response and total output, whereas resources was correlated (moderately) only with the awakening response (see table 16).

**TABLE 18: Correlational analyses of appraisal and cortisol at T3**

	SAMA threat	SAMA challenge	SAMA resources
<b>CARAUCg</b>	-0.27	0.10	-.35*
<b>CARAUCi</b>	-.39*	-0.14	-0.15
<b>FULLAUCg</b>	-.43*	-0.12	-0.26
<b>FULLAUCi</b>	-0.21	-0.15	-0.20

*Note* \*  $p < .05$ , \*\*  $p < .01$

Although correlational analyses suggested that there is a nuanced relationship between appraisal and cortisol, further analysis using regression techniques reveals that none of the appraisal variables were significant predictors of variation in cortisol responses.

There appeared to be some small differences in means scores on the SAMA questionnaire between children in the 'normal pattern' group and those in the 'small rise' group (see Table 19). Children in the small rise group scored higher on all of the appraisal variables,

both positive and negative types. This might suggest that children with highly dysregulated cortisol profiles have attached a greater level of significance to (and made stronger appraisals of) routine stressors than children with a typical diurnal cortisol profile.

**TABLE 19: Mean scores and standard deviations on the SAMA according to cortisol profile**

	T2 Exams		T3 Transition	
	Normal pattern	Small rise	Normal pattern	Small rise
<b>SAMA Threat</b>	1.13 (.62)	1.25 (.55)	1.26 (.70)	1.13 (.70)
<b>SAMA Challenge</b>	2.15 (.97)	2.18 (.63)	2.79 (.80)	2.98 (.73)
<b>SAMA Resources</b>	2.47 (1)	2.97 (.92)	3.32 (.69)	3.48 (.43)

#### ***7.4.10 Cortisol and outcomes***

Initial correlational analyses of the relationship between cortisol and outcomes revealed no significant relationships between cortisol and mental health outcomes (total difficulties, emotional symptoms and conduct problems). Thus it can be concluded that the relationship between appraisal and mental health outcomes was not partially mediated by cortisol.

#### ***7.4.11 Summary of cortisol findings in relation to Q3***

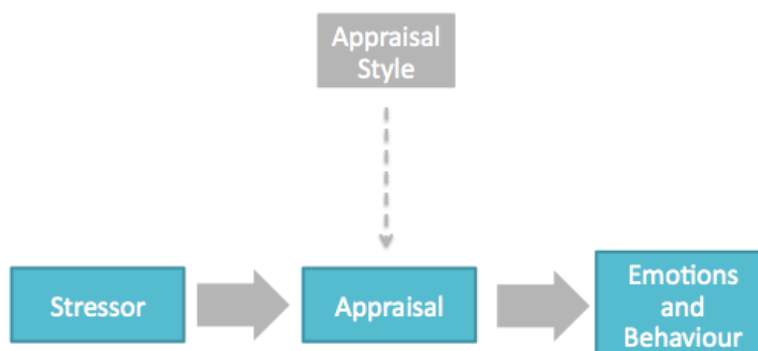
Contrary to expectations, there were no significant differences in cortisol levels between pre-stressor baselines and mid-stressor timepoints, suggesting that cortisol (and the HPAA) was not responsive to these routine stressors. Nevertheless, there was a trend towards elevated cortisol secretion during the transition period and perhaps with a larger sample (that has sufficient statistical power) a statistically significant relationship would have been detected. It is also notable that a small proportion of children experience irregular HPA functioning across each time point (labelled the ‘small’ and ‘no rise’ groups), and at T3 over two-thirds of this group show signs of a completely flattened cortisol pattern that might suggest they are experiencing chronic stress.

Collectively, these findings tentatively suggest that in the context of routine stressors such as exams and transition, the relationship between appraisal and mental health was not partially mediated by either coping or cortisol.

## 7.5 THE PRESENCE OF APPRAISAL STYLES

An emerging debate within the stress literature focuses on the issue of specificity within the appraisal process. Are people consistent in the types of appraisal they make across different situations or do the particular qualities of the stressor and the context it occurs in dictate the type of appraisals made? There are good reasons, as outlined in Chapter Five to suggest that many children do in fact develop appraisal styles. This study examined the consistency of children's appraisals across time and across context (see Fig.18).

**FIGURE 18: Appraisal style as a moderator of the cognitive appraisal process**



It was hypothesized that some children would not have a consistent style; their appraisals would be context-dependent and vary across time points. Some children would have a positive style characterised by cross-situationally consistent appraisals that comprise high challenge and high perceived resources to cope scores. A further group of children would demonstrate a consistently negative style of appraising stressors, comprising high levels of threat and low levels of perceived resources to cope ( $H_4$ ).

The data produced by the SAMA measure for each subscale is continuous and there are no thresholds to determine categorically whether a respondent has made a threat appraisal, or a challenge appraisal or an appraisal that they do have the resources to cope

with a stressor. Thus, a threshold<sup>41</sup> was devised and applied to children's scores on each SAMA subscale, at each time point. Including pre-stressor T1 when children were asked to describe how they usually/normally respond to stressors.

The number of children who reached the threshold of having made a threat appraisal at each time point was relatively low compared to those who made challenge and resources appraisals (see Table 20). Over half of the sample, at T1, T2, and T3 made positive appraisals. This finding indicates that on average these children tended to think positively about exams and transition and potentially about other similar routine stressors in their lives.

**TABLE 20: Frequency of appraisal type at each time point**

TIMEPOINT	THREAT	CHALLENGE	RESOURCES
<b>T1 PRE-STRESSOR</b>	6 (10%, n=58)	32 (51%, n=63)	45 (73%, n=62)
<b>T2 EXAMS</b>	8 (13%, n=60)	42 (68%, n=62)	48 (76%, n=63)
<b>T3 TRANSITION</b>	6 (14%, n=42)	37 (86%, n=43)	42 (96%, n=44)

None of the appraisal categories are mutually exclusive, threat and challenge represent different types of primary appraisal whereas resources represent secondary appraisal. Although unlikely, it is possible for a person to make an appraisal that is both high on threat and high on challenge (see *Chapter Four*). Thus, the appraisals that children make at each time point can comprise all of the different types (i.e. threat, challenge and resources), just two of the types (i.e. Challenge and resources), only one type (i.e. challenge) or potentially none. The latter refers to instances where the child's appraisal might be best characterised as benign - they do not consider a stressor to be demanding (either in a positive or negative way). Thus there are many different potential

<sup>41</sup> As outlined in *Chapter Six* the threshold prescribed that a respondent who has a total subscale (threat, challenge or resource) score that is at least half of the total possible score for that scale is categorised as having made that type of appraisal. Three dichotomous variables were thus created: challenge 1 = yes, 0 = no; threat 1 = yes, 0 = no; and resources 1 = yes, 0 = no.

combinations that provide a composite description of the way in which a child has appraised a particular stressor. In order for there to be evidence of an appraisal *style*, a child's combination must be consistent (in other words the same) across different timepoints.

Table 21 illustrates the different combinations found in children's appraisal at each time point (T1 pre-stressor; T2 exams; and T3 transition). There are four broad types of appraisal: positive (comprising challenge and/or resources to cope), negative (comprising threat), mixed (comprising a combination of threat and either challenge or resources to cope) and benign (scores do not reach threshold for either threat, challenge or resources to cope). The data reveals that the large majority of children made positive appraisals in relation to both of the routine stressors under study (exams and transition) and also report making positive appraisals when asked to think about how they usually respond to stressful situations (T1). Far fewer children made negative or mixed types of appraisal at each time point.

The trends over time are also interesting. Although positive appraisals appear to decrease across each time point, there were large numbers of missing data at T3 (24 cases). Valid percentages (i.e. percentage of all of the cases with complete data at the specific time point) indicated that positive appraisals actually increased at transition when compared to T1 and T2. Threat appraisals on the other hand decreased steadily over time, both in terms of straight counts and valid percentages, again this could be an artefact of greater numbers of missing cases at T3. It is possible that the children who did not complete data collection at T3 are those children who negatively appraised the transition to secondary school and who were struggling to cope; hence they failed to return the self-report survey.

A simple cross tabs analysis (to compare the number and type of appraisals at each time point) revealed that the only appraisal style to demonstrate any consistency across all three timepoints was the combination 'challenge and resources' ( $n = 13$ ). These are children who make appraisals that are characteristically high on scores of challenge and resources and low on threat, thus they are referred to as 'positive thinkers'.

**TABLE 21: Frequency of each combination of appraisal types at each time point**

COMBINATION	T1 PRE-STRESSOR	T2 EXAMS	T3 TRANSITION
<b>POSITIVE</b>			
Challenge	1	3	0
Challenge & resources	27	31	31
Resources	15	7	3
<b>SUBTOTAL</b>	<b>43 (74%)</b>	<b>41 (69%)</b>	<b>34 (81%)</b>
<b>NEGATIVE</b>			
Threat	5	2	0
<b>SUBTOTAL</b>	<b>5 (9%)</b>	<b>2 (3%)</b>	<b>0 (0%)</b>
<b>MIXED</b>			
Threat & challenge	1	0	0
Threat, challenge & resources	0	5	5
Threat & resources	0	1	1
<b>SUBTOTAL</b>	<b>1 (1.7%)</b>	<b>6 (10%)</b>	<b>6 (14%)</b>
<b>BENIGN</b>	<b>9 (15%)</b>	<b>10 (17%)</b>	<b>2 (5%)</b>
<b>MISSING DATA</b>	<b>8</b>	<b>7</b>	<b>24</b>

These children comprise a relatively small sub-group of the total sample (20%) of children recruited for this study. A further 38 children (58% of the total sample) for whom there were relevant data displayed inconsistency in the types of appraisal they made in different situations. Thus this group have been labelled the 'flexible group'.

It is worth noting that in terms of consistency over the mid-stressor timepoints only, in other words excluding T1, the patterns were similar. The large majority of children were not consistent and demonstrate a flexible approach to each context ( $n = 35$ ). Asides from two individual children who display consistency, one 'benign' and one 'threat, challenge and resources', the only substantial group of children displaying an appraisal style remains the 'positive thinkers' ( $n = 17$ ). In this analysis the group represents 26% of the total sample.



The positive thinkers (n=13) comprised four girls and nine boys and the majority of them (n=11) attended the same three primary schools. Approximately one third of this group (n= 3) live with parents who can't afford at least two socially perceived necessities, and therefore might be described as living below the poverty line, the remainder of the group (n=8) live with parents who can afford all socially perceived necessities. Of the children who were consistent across the two mid-stressor points only (n=17), similar demographics were observed. Eleven of the 17 children were male and six female, they largely came from the same three schools (n = 13). Only three children (of 14 for whom data was available) could be described as living below the poverty line. These data suggest that gender and socio-economic status, in addition to school-based factors might be important in the development of positive appraisal styles.

#### ***7.5.1 Summary of findings in relation to Q4***

In summary, the findings of the descriptive analysis pertaining to the consistency and stability of children's appraisals over time suggests that for the most part children were flexible in the types of appraisals they made in different stressor contexts. No evidence was found for the existence of a negative appraisal style, reflecting the low levels of perceived threat in the sample more generally. There is however, one small sub-group of children who consistently appraised stressors positively, scoring high on challenge and resources to cope scales.

### **7.6 THE RELATIONSHIP BETWEEN APPRAISAL STYLES AND MENTAL HEALTH**

*Chapter Five* presented evidence that appraisal styles have the potential to influence children's development. Thus it was hypothesized that children with a positive style would have fewer emotional and behavioural difficulties than children with a negative style or those who demonstrate no style at all (H<sub>5</sub>).

As reported earlier in this chapter, evidence was found for only one type of appraisal style in this sample characterised by consistently high challenge and resources to cope appraisals. There were 13 children in this 'positive thinker' group across all three time points and a further four children who were consistent just across T2 and T3. Further analysis of the differences in mental health between this group and children who appraise stressors more flexibly reveal that the positive thinkers have consistently better

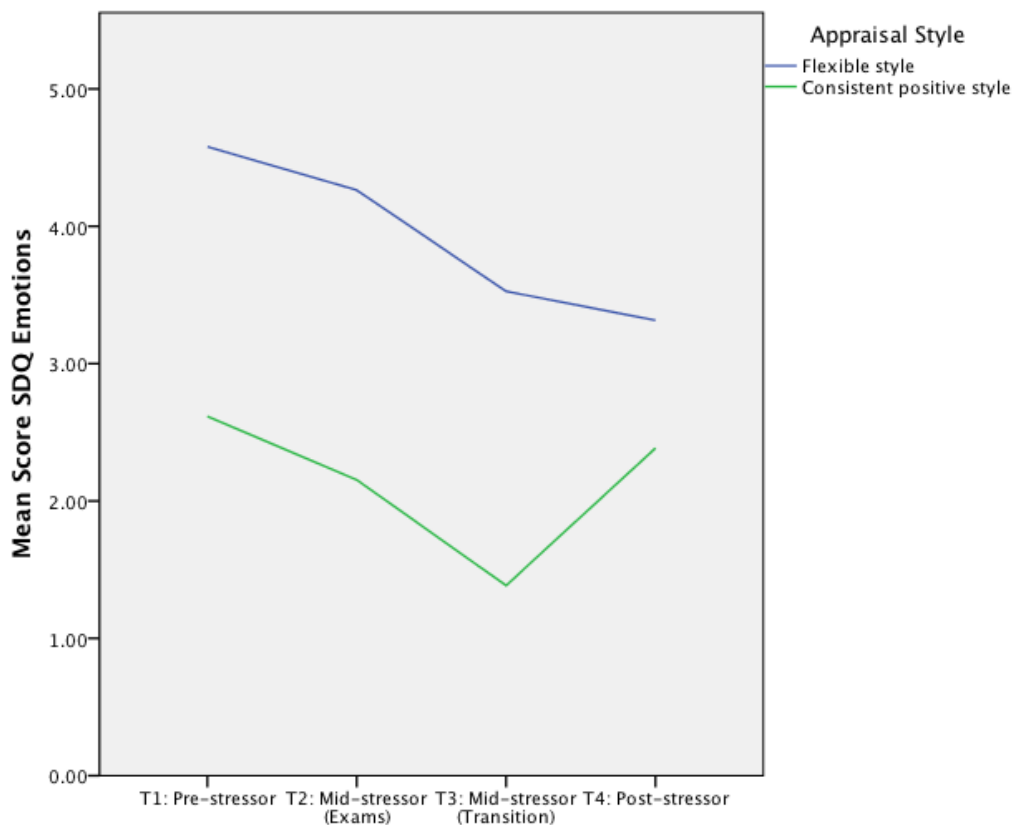
mental health outcomes during both mid-stressor points and at less stressful times such as baseline and follow-up (see Table 22). It is also notable that these findings were also replicated in the sample of 17 positive thinkers who were consistent across T2 and T3 only. These differences were visually illustrated in Figs 19-21; graphs charting SDQ total difficulties, emotions and conduct mean scores for both the consistent positive thinkers and the flexible group across each time point.

It is important to note that although there were large standard deviations suggesting considerable outcome variation within both groups, independent samples *t* tests confirm that the differences in mean scores were statistically significant with the exception of differences in emotional difficulties at T2 and T4 (see Table 22).

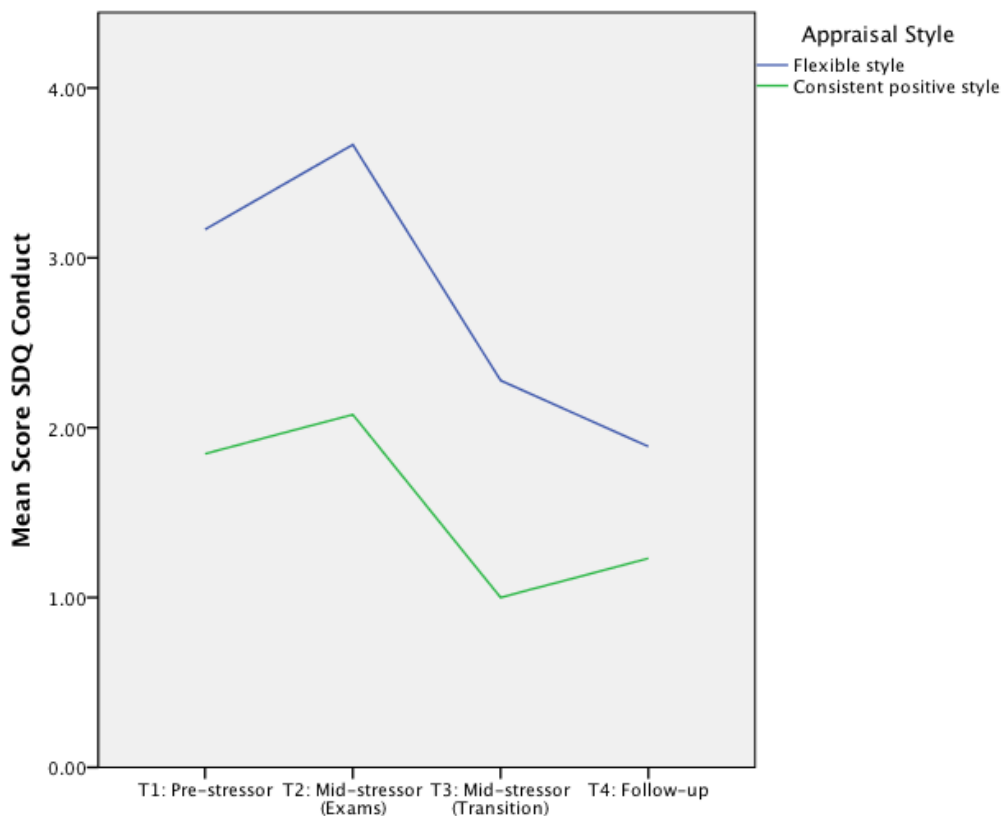
**TABLE 22: Mean scores on SDQ subscales in the flexible and positive thinker group and related samples *t* tests of differences between both groups**

TIMEPOINT AND SDQ SUBSCALE	FLEXIBLE (n = 38)	POSITIVE THINKERS (n = 13)	RELATED SAMPLES T TESTS
<b>T1 PRE-STRESSOR</b>			
SDQ EMOTIONS	4.24 (2.49)	2.61 (2.40)	<i>t</i> (49) = -2.05, <i>p</i> < .05
SDQ CONDUCT	3.13 (1.66)	1.85 (1.52)	<i>t</i> (49) = -2.46, <i>p</i> < .05
SDQ TOTAL DIFFS	15.45 (6)	10.15 (5.58)	<i>t</i> (49) = -2.79, <i>p</i> < .01
<b>T2 EXAMS</b>			
SDQ EMOTIONS	3.45 (2.37)	2.15 (2.23)	NS
SDQ CONDUCT	3.18 (1.45)	2.08 (.76)	<i>t</i> (49) = -2.62, <i>p</i> < .05
SDQ TOTAL DIFFS	16.50 (3.78)	12.62 (3.99)	<i>t</i> (49) = -3.15, <i>p</i> < .01
<b>T3 TRANSITION</b>			
SDQ EMOTIONS	3.16 (2.59)	1.38 (1.98)	<i>t</i> (36) = -2.16, <i>p</i> < .05
SDQ CONDUCT	2.12 (1.42)	1.00 (.71)	<i>t</i> (36) = -2.66, <i>p</i> < .05
SDQ TOTAL DIFFS	11.52 (5.67)	5.85 (4.56)	<i>t</i> (36) = -3.11, <i>p</i> < .01
<b>T4 FOLLOW-UP</b>			
SDQ EMOTIONS	3.38 (2.08)	2.38 (2.57)	NS
SDQ CONDUCT	2.29 (1.80)	1.23 (1.01)	<i>t</i> = -1.96, <i>p</i> = .05
SDQ TOTAL DIFFS	12.26 (5.30)	8.23 (6.57)	<i>t</i> (38) = -2.08, <i>p</i> = .04

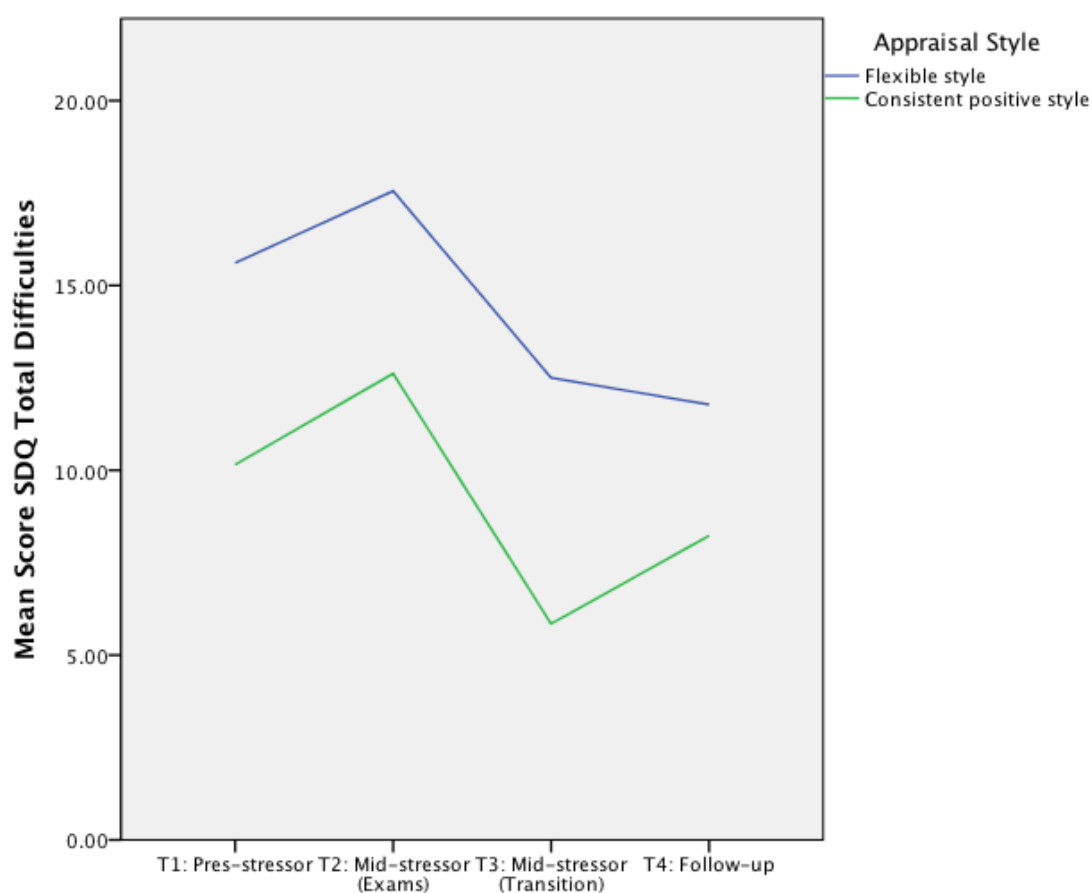
**FIGURE: 19: Chart displaying differences in mean scores in total difficulties, over time, between the flexible and positive thinker groups**



**FIGURE: 20: Chart displaying differences in mean scores in conduct problems, over time, between the flexible and positive thinker groups**



**FIGURE 21: Chart displaying differences in mean scores in emotional difficulties, over time, between the flexible and positive thinker groups**



### **7.6.1 Summary of findings in relation to Q5**

There were clear differences between positive thinkers and flexible appraisers with regards to mental health. The former had consistently better mental health across all timepoints, and these differences are statistically significant.

## **7.7 SUMMARY OF FINDINGS**

### ***The relationship between routine stressors and children's emotions and behaviour***

- The general pattern in the longitudinal data indicated that children, on average, were able to adapt successfully to the demands of routine school-based stressors.
- There was evidence of specificity in the relationship between these stressors and psychological outcomes; whilst the SATs exams were associated with a statistically significant deterioration in children's mental health, conversely the transition to secondary school was accompanied by a statistically significant improvement.

### ***The ability of cognitive appraisal to predict variation in children's emotions and behaviour***

- Within the broad trends of greater emotional and behavioural difficulties at exams and fewer difficulties at transition there was considerable individual-level variation.
- The strength of the relationship between cognitive appraisal and mental health in this study was such that it was possible to reliably predict children's outcomes based on their self-reported appraisals of each stressor. Relatively large amounts of variation were explained at each mid-stressor time point, ranging between 5% and 21%.
- There was also further evidence for specificity in the mechanism with regards to the type of appraisal that had predictive value at each time point. Whilst threat was a significant predictor at exams, challenge was not. The reverse was observed at transition, at which time challenge was a significant predictor of outcomes and threat was not.

### ***The relationship between appraisal and coping***

- The relationship between appraisal and coping was significant and it was possible to predict children's coping strategies from their scores on an appraisal measure.
- This study found that differences in appraisal explained approximately 10% to 30% of the variance in almost every type of coping strategy.
- Positive appraisals were associated with greater use of approach coping strategies such as assistance seeking and cognitive problem solving.
- The findings also suggested that negative appraisals were associated with greater use of all types of coping and it seems that children who perceive some sense of threat arising from the stressor deploy all of the coping resources available to them.
- Surprisingly however, resources to cope appraisals were poor predictors of coping strategies.

### ***The relationship between appraisal and cortisol***

- Children were not physiologically responsive to either exams or the transition to secondary school; cortisol levels, on all measures, remained stable between baseline and exams (T2). There is a slight increase between baseline and transition (T3), but this increase was not statistically significant and levels remained within the normal range for children of a similar age in the general population.

### ***Coping and cortisol as mediators of the relationship between appraisal and outcomes***

- The study did not find evidence that the significant predictive value of appraisal is mediated by either coping or cortisol.

### ***Consistency in the appraisal process***

- The majority of children in the sample were not consistent in the types of appraisals they made at baseline, exams and transition - they displayed flexibility in the appraisal process.
- However, there is a small sub-group of children ( $n = 13$ ) who were consistent across all three timepoints. These children are consistent positive thinkers; at all time points their appraisals were characterised as comprising high challenge and high resources to cope scores - they appeared to display a challenge-oriented appraisal style.
- Furthermore, on average, the children in the sample perceived increasingly larger amounts of challenge and progressively more resources to cope over the course of the year in which they were studied and increasing numbers of children were consistent over time.

### ***The relationship between appraisal styles and outcomes***

- Children displaying a challenge-oriented appraisal style had significantly better outcomes (emotions, behaviour and total difficulties) at every time point than the flexible group.

## **CHAPTER 8: DISCUSSION**

### **8.1 INTRODUCTION**

There has been significant interest in childhood stress in recent decades (Ager, 2013; Grant et al., 2011; Rutter, 2013; Wilkinson and Goodyer, 2011) and evidence that exposure to extreme stress can have profound effects on all aspects of children's development is compelling (Blair et al., 2011; Essex et al., 2011; Gunnar and Quevedo, 2007). Increasingly evidence also points towards the role of routine stressors in shaping children's mental (and physical health) (DiCorcia and Tronick, 2011). Stressors are often conceptualised as having a negative impact on development, however research reveals that not all children succumb to the risks associated with stress (Cooper and Bright, 2001). Indeed, some children appear to do well or even better following the experience of stress (Meyerson et al., 2011).

Understanding the factors and processes that might explain these individual differences has been the core inquiry at the heart of this thesis. It sought to advance understanding of the role of cognitive appraisal in explaining variation alongside two other stress response processes (coping and cortisol) and in doing so make a significant contribution to an under-researched area. The main findings are presented in this discussion chapter and synthesised with the existing literature. The novel contribution of the thesis is outlined and the relative strengths and weaknesses of the study are also presented. Towards the end of the chapter recommendations for future research are made

### **8.2 THE IMPACT OF ROUTINE STRESSORS**

This study explored the impact of two routine school-based stressors, KS2 exams and the transition to secondary school, on children's emotions and behaviour. The analyses presented in *Chapter Seven* strongly suggested that exams and transition influence children's psychological outcomes - there were significant differences in behaviour and emotions at each stressor time point when compared to baseline. This is an important finding given that routine stressors are generally under-represented in the stress literature (Holen et al., 2012; Haraldsson et al., 2010; Lau, 2002). The primary reason for the dearth of research stems from the widely held belief that these types of experiences

are unlikely to impact meaningfully on children's health or development (Folkman, 2009; Pincus and Friedman, 2004; Kliwer, 1998). This study suggests that this is not the case.

The general pattern in the longitudinal data indicated that children, on average, are able to adapt successfully to the demands of this challenging period; whilst baseline levels of children's emotional and behavioural difficulties were higher than might be expected (a point returned to later), at no point during the course of the year that they participated in the research, does the *average* child reach thresholds on the SDQ that would imply they might have a clinically diagnosable mental health disorder. The findings also indicate that the positive gains in mental health made at the transition are sustained in the longer-term - as much as six months later. This suggests that the effects of routine stressors may not be transient and that there may be carry-forward effects (a point returned to in the next chapter).

Nevertheless, there was a great deal of specificity in the relationship between these stressors and outcomes; whilst the SATs exams were associated with a *deterioration* in children's mental health, conversely the transition to secondary was accompanied by a significant *improvement*. This is an unexpected finding, and was not hypothesised. The effects of each stressor are now examined before a discussion of what these findings suggest about specificity in the stressor-outcome relationship more generally.

### **8.2.1 The impact of examinations on mental health**

The deterioration in outcomes during the SATs exams was statistically significant. During the SATs children experience heightened emotional and behavioural difficulties. This finding is in line with a substantial body of empirical evidence documenting that stressful life events have a negative impact on functioning (see Fink, 2010 for a review).

Whilst the average child did not reach thresholds of likely disorder, research outlined in *Chapter Three* has demonstrated that even relatively small increases in symptoms as experienced by children in this study can produce very real changes in children's lives. Even the presence of one symptom can result in functional impairment with regards to children's development and their ability to engage and perform at school. Harrington and Clark's (1998) epidemiological study of depression in a sample of UK school children



revealed that parent-reports of children doing badly at school increased according to the number of symptoms of depression self-reported by the 11-15 year olds. Crucially, those experiencing just one or two symptoms of depression were significantly more likely to be impaired than those without any symptoms at all (Harrington and Clark, 1998).

The results of this study also reflect evidence from educational research into the consequences of testing and examinations on children's well-being. A large number of studies have documented the impact of exams on children's emotional outcomes and suggests that there are groups of children who experience 'test anxiety' (Bosch et al., 2004; Putwain, 2009a; Schwarzer and Buchwald, 2003). A sizeable body of quantitative and qualitative data suggests that test anxiety interferes with children's ability to perform well under test conditions and causes them considerable distress prior to sitting the test (Putwain, 2009b; Weems et al., 2010; Zatz and Chassin, 1985). Less is known about the impact of this particular stressor on children's behaviour and general mental health however (Schwarzer and Buchwald, 2003; Wrzesniewski and Chylinska, 2007).

The potentially harmful effects of SATs, such as those taken at KS2, on a variety of outcomes including mental health are widely cited despite a lack of empirical evidence supporting these claims (see Connors et al., 2009). Evidence tends to come from small, unrepresentative studies in which the effect of exams on mental health is not the main focus. Thus this study makes a significant contribution to the literature as it is one of the first studies of KS2 exams to adopt robust measurement of outcomes and to investigate the links between exams and mental health prospectively.

### ***8.2.2 The impact of transition to secondary school on mental health***

Perhaps one of the most striking findings of this study is that children, on average, had substantially *better* mental health during the transition than they did at a pre-stressor baseline. In one respect this finding is surprising; the majority of research on transition is found in the education arena and many studies suggest that transition has negative consequences for a variety of outcomes including self-esteem and subjective well-being (Chung et al., 1998; Seidman et al., 1994; Zeedyk et al., 2003).

There are however a number of longitudinal studies of school transition that suggest this particular stressor has no detrimental effects on pupils (Hirsch et al., 1993; Hirsch and

Rapkin, 1987; Nottelmann, 1987). In one highly regarded study of 112 US students making the transfer between elementary and junior school Simmons (1987) reported an overall *increase* in self-esteem. Furthermore, in one of the most widely cited and comprehensive studies of transition in UK school children - the ORACLE (Observational Research and Classroom Learning Evaluation) transfer study conducted between 1975 and 1980 in 58 classrooms - researchers found that although anxiety levels amongst school children was high in the June prior to transfer to secondary school, those levels of anxiety declined in the first term of secondary school and had further declined by the following June (Galton et al., 2000). Similarly in a study of 865 Viennese children, Sirsch (2003) found that 50% of the children reported having a positive experience during the transition, whereas 20% reported it as a difficult or negative experience (incidentally, this pattern reflected differences in retrospectively reported threat and challenge appraisals).

It is important to note that whilst the transition to secondary school was associated with positive improvements in psychological outcomes in this study, those improvements might not extend across the broad range of children's development and functioning. Research from within the educational psychology field, for example, does report that children experience a dip or hiatus in academic performance and levels of school engagement in the first year of secondary school (Doddington et al., 1999). It is also possible that there is an issue of timing influencing the findings; emotional and behavioural difficulties were measured during the first week of secondary school and again six months later, perhaps if data had been collected in November or December a dip may have been observed. Furthermore, reductions in mental health difficulties do not necessarily equate to increases in 'positive mental health' (Huppert and So, 2011). Children's outcomes are better at the transition in the sense that they report significantly fewer symptoms of emotional and behavioural difficulties at this time point than at baseline. We would need further research that incorporates measures of positive dimensions of well-being, such as happiness or quality of life, in order to explore whether transition truly has a 'positive' effect on mental health (Seligman et al., 2004).

Nevertheless these findings are of relevance and significance for the stress literature and the burgeoning field of positive psychology; in particular the prospect that some potentially stressful experiences can act as a stimulus for healthy development.

Researchers have previously shown that children who experience low level adversities are better able to cope with a range of stressors than children who have never experienced adversity and that relatively minor stressors promote growth including higher levels of psychological functioning than previously experienced (Aldwin and Levenson, 2004; Dienstbier, 1992; Dienstbier, 1989). Longitudinal findings discussed later in this chapter suggest that one of the primary factors behind the positive impact of transition might be children's *increasing* capacity to make positive appraisals of potentially stressful situations.

### ***8.2.3 Specificity in the relationship between routine stress and outcomes***

The contrast between the effects of exams and transition on mental health outcomes, suggested in this study, speak to current debates about specificity in the stressor-outcome relationship within the broader stress literature (Bancila and Mittelman, 2005; Grant et al., 2011; Nicolai et al., 2012). Previously researchers have found only limited empirical evidence for specificity (Grant et al., 2011). It has been proposed that the reasons for this are largely methodological in origin. McMahon et al. (2003) proposes that the lack of evidence is due to the fact that the majority of studies either focus on discrete life events and that even where multiple stressors are considered researchers tend to employ checklists that transform data into single composite measures. This makes it difficult to disentangle the different effects that different stressors could theoretically have on a range of developmental outcomes (Nicolai et al., 2012). Furthermore, many studies have involved clinical samples and therefore measure impact in terms of psychopathology (Holen et al., 2012). The co-morbidity of different psychopathologies (such as anxiety and depression) is well documented, thus making specificity even harder to detect (Arcelus and Vostanis, 2005). All of these issues hamper the ability of reviewers to determine if different stressors have specific effects.

By contrast, one of the strengths of the present study was that the research design facilitated a prospective examination of the impact of two qualitatively different stressors. Whilst exams and transition might both be defined as routine stressors they differ according to key characteristics and the types of demands they place on the children experiencing them. Whereas exams are largely an individual intellectual task, the transition has implications for their educational and social lives. One interpretation of the

different relationships between exams and transition could be that contextual factors relating to the qualities and external conditions of stressors have a sizeable influence on the nature of the relationship between stress and outcomes.

Accordingly, there are consequences for those interested in developing stressor taxonomies. Given the differences in impact, how useful is it to group these two stressors together under the heading of school-based, or routine? Is it possible to generalise findings from exams and transition to all routine stressors? If not, then what is the use of grouping different stressors together? There is a clear need for further research on this topic (Nicolai et al., 2012). McMahon et al. (2003) explain “the basic methodological requirement for specificity research is that the stressful experience is categorized by type of stressor, the psychological outcome is categorized by type of psychopathology, or both stressor and outcome are categorized. Although stressors can be categorized in numerous ways, categorization by type of event is the most appropriate.....However, much additional work needs to be done in conceptualizing and measuring stressors in a manner that captures the complexity of stressors in order to establish a meaningful examination of specificity in relation to psychological outcomes” (p.108). The findings of the study reported in this thesis suggest that the classification of stressors as “routine” may not be useful. It is possible that within the broad heading there are variations according to the particular qualities of the stressors.

It is important to pause at this point to acknowledge that the findings presented thus far do not robustly confirm causality in the relationship between routine stress and mental health. The only way to know definitively whether exams and transition caused these changes in mental health and not another unidentified factor in the children’s lives would be to compare their outcomes to children in a randomly allocated control group. This was not possible for the purposes of this PhD for reasons outlined in *Chapter Five*.

Nevertheless, a degree of confidence in the findings is secured by virtue of the prospective longitudinal design. The findings suggest that there is a relationship between routine stress and outcomes, and contributes to reducing the gap in current knowledge about the potential of commonly experienced, routine stressors to disrupt or indeed promote children’s functioning and development at least in the short-term.

The primary focus of this PhD is on explaining individual variation in children's outcomes in response to the presence of routine stressors. Having established a link between these previously under-researched stressors and children's psychological outcomes it was possible to explore the extent to which there were individual differences in those outcomes.

### **8.3 INDIVIDUAL DIFFERENCES IN RESPONSE TO ROUTINE STRESS**

Within the overall trends of poorer outcomes at exams and better outcomes at transition (as reported in the previous section and in *Chapter Seven*) there is considerable individual-level variation. The data collected for this study confirms that in the context of routine stressors, some children's mental health gets worse, others improved and some children remain unaffected. This variation supports claims within the literature that there are high levels of individual differences in children's responses, even to relatively minor stressor experiences previously thought to have little or no effect on children's health and development (DiCorcia and Tronick, 2011; Power and Hill, 2009; Sirsch, 2003). What is more, some children, notably 32% of the children during the examination period appear to be resilient to the risks posed by the stressor and indeed experience an advantage or benefit from exposure to it.

Understanding what causes individual differences invariably leads to questions about the factors and processes that are involved in translating stressors into outcomes. As was outlined in *Chapter Two* and *Chapter Four*, many researchers agree that cognitive appraisal is a key process influencing the relationship between stressors and outcomes, although empirical evidence is lacking. Appraisal has been linked directly to outcomes (David and Compas, 1986; Folkman et al., 1986; Hasan and Power, 2004; Hood et al., 2009; Jackson and Warren, 2000) and indirectly via relationships with other identified stress response processes, such as coping behaviour and cortisol (Denson et al., 2009). Indeed, appraisal is widely cited as a general organising construct for behaviour and physiology in stressful contexts (Clarke, 2006; Gaab et al., 2005). In the next section we examine what the results of the present study suggest about these two hypotheses.

## 8.4 EXPLAINING VARIATION IN CHILDREN'S OUTCOMES WITH COGNITIVE APPRAISAL

The study confirms that children's cognitive appraisals of routine stressors are linked to their mental health outcomes in the context of routine stressors. Positive types of appraisal such as challenge and resources to cope were associated with fewer mental health difficulties, whereas negative appraisals were associated with greater difficulties. This means that a child who perceives something to gain from either the transition or exams and believes that they have the resources to cope with the demands of each stressor behaves better and has a greater sense of emotional well-being, than children who perceive nothing to be gained from these situation and who feel unable to cope.

Whilst these links are often theorised in the literature, they are rarely tested empirically, particularly in samples of children and adolescents experiencing stressors in real-world contexts (Gaab et al., 2005; Grant et al., 2006; Sirsch, 2003). Thus, this study is amongst the first to demonstrate that threat and challenge are directly associated with children's psychological well-being. The findings are supported by the literature on appraisal in adults (e.g. Brown and Vanable, 2011; Trute and Hiebert-Murphy, 2003) and by the few studies that have been conducted on children and adolescents (e.g. Muris, et al., 2005; Mak et al., 2004). Muris et al. (2005) for example reported a strong link between threat appraisals and anxiety levels in the context of minor stressors and ambiguous situations. However, those stressors and situations were presented as vignettes whereas the current study analysed children's appraisals in response to real-world stressors in real-time. In another example Mak et al. (2004) investigated the link between threat and depression and found that challenge appraisals were associated with fewer symptoms and threat was associated with more symptoms. The secondary school students involved in their research were older than in the current study. Finally, a study by Hasan and Power (2004) also found that children who recalled making negative appraisals of recent stressors had greater numbers of self-reported symptoms of both depression and anxiety. Though similar findings are reported, the current study utilised a prospective, longitudinal design.

The strength of the relationship between appraisal and mental health in this study is such that it is possible to reliably *predict* children's outcomes based on their self-reported appraisals of each stressor. It has been reported that variables rarely account for more

than 10% of the variance in other variables (Petersen, 1991), though studies have shown that stressful events can account for up to 15% of variance in psychological symptoms (Seiffge-Krenke et al., 2001). In the present study, relatively large amounts of variation were explained at each mid-stressor time point. Threat appraisals explained between 5% 12% of the variance in conduct outcomes during the SATs exams. Challenge appraisals accounted for even larger amounts of variance during the transition, explaining between 10 and 21%.

Generally speaking, this study suggests that appraisal was a good predictor of children's outcomes. It appears that, on average, children experienced greater emotional and behavioural difficulties during the exam period, but appraising this routine stressor as a threat posed an additional risk in the context. Similarly, most children experienced improvements in their mental health during the transition to secondary school, but for those who appraised this stressor as a challenge the psychological benefits were even larger.

There is specificity in the *type* of appraisal that has predictive value at each time point. Whilst threat was a significant predictor at exams, challenge was not. The reverse was true at transition, at which time challenge was a significant predictor of outcomes but threat was not. One conclusion that we might draw from this finding is that appraisal is responsive to routine stressors, but specific types of appraisal are linked to particular types of stressor. Perhaps threat is salient in performance-based stressors such as exams, whereas challenge operates for social stressors such as the transition to secondary school. As has been stated previously, empirical research on stress in children is not advanced and more research is clearly needed to both clarify the role of appraisal and also to establish if the process operates differently in the context of different stressors (Schneiderman et al., 2005; Smith and Kirby, 2011; Tomaka et al., 1993). Clearly the findings speak to the debate on specificity in much the same way as was described earlier in the chapter.

There is some evidence from the physiological stress literature that supports the general proposition that specific types of appraisal might be linked to broad types of stressor (Smith and Kirby, 2011). These studies suggest that the controllability of a stressor could

be a key distinguishing factor between challenge and threat (Gunnar et al., 2009; Park and Folkman, 1997). Dickerson and Kemeny's (2004) review of physiological responsiveness to a range of stressors suggests that challenge appraisals are predictive of outcomes in the context of controllable stressors, whereas threat appraisals might account for greater levels of variation under the conditions of uncontrollable stressors (Dickerson et al., 2009; Dickerson and Kemeny, 2004). The extent to which transition or exams are controllable or uncontrollable is difficult to disentangle and will likely depend on an individual's subjective interpretation of the demands that are placed on them. The same review refers to 'social evaluative threat' as another key determinant of physiological responses. The HPA axis is particularly responsive to stressors that comprise social-evaluative elements (i.e. an audience present and potential for others to negatively evaluate performance) and Dickerson and Kemeny (2009; 2004) report that these stressors elicit increases in cortisol more than four times the magnitude of those that do not contain a social-evaluative component (effect size  $d=0.67$  and  $d=0.15$ , respectively).

Threat and challenge are key components of primary appraisal, but what of secondary appraisal and the extent to which children's beliefs about their resources to cope accounts for variation in their outcomes? Surprisingly, secondary appraisals were not related to mental health outcomes at either of the mid-stressor timepoints. Though more empirical testing of the relationship between secondary appraisal and children's emotions and behaviour is needed, there is evidence in the literature to suggest that children who display higher levels of resources to cope experience fewer emotional and behavioural difficulties (e.g. Lee-Flynn et al., 2011; Zalewski et al., 2011; Hood et al., 2009). The finding of the current study is also surprising given the larger literature on the importance of self-efficacy beliefs for general wellbeing (Karademas, 2006; Karademas and Kalantzi-Azizi, 2004; Rees and Freeman, 2009; Schwarzer and Knoll, 2007; Tram and Cole, 2000; Ziegelmann and Lippke, 2009). One possible explanation for the results of the present study is that there *is* a relationship between secondary appraisal and psychological outcomes, but the study was not sufficiently powered to detect this relationship due to the relatively small sample size (Vogt, 2011).

However, perhaps there is no relationship and these findings lend further support to the notion of specificity as proposed by various stress researchers (e.g. Bancila and



Mittelmark, 2005; McMahon et al., 2003; Rutter et al., 2001; Seery, 2011). It is possible that resources to cope appraisals impact on other dimensions of mental health or functioning not analysed in this study, such as peer relationships or self-esteem. It is also plausible that resources to cope appraisals have predictive value for outcomes that are closely tied to the particular demands of the specific stressor; resources to cope might explain variance in academic performance during exams and quality of peer relationships at the transition for example. Extending the specificity explanation further, another alternative explanation is that resources to cope appraisals are a significant predictor of emotions and behaviour in the context of different stressors and not specifically in the context of exams or transition stressors. Perhaps resources to cope appraisals are not operational in the context of routine stress, but become significant in the context of acute stressors such as bereavement or inter-parental conflict?

This study was designed not only to explore the relationship between appraisal and outcomes, but to also examine the conditions under which this cognitive process operates. Thus the next section explores the extent to which challenge and threat appraisals influence outcomes because of their relationship with two other stress response processes - coping and cortisol.

## **8.4 THE RELATIONSHIP BETWEEN APPRAISAL, COPING AND CORTISOL**

### ***8.4.1 Appraisal and coping***

Previously, far greater attention has been paid to the concept of coping within the literature, than appraisal (Smith and Kirby, 2011). This is surprising because the transactional theory of stress proposes that coping efforts are largely driven by the nature of the appraisals individuals make in relation to an impending stressor (Park et al., 2004). Very few studies have investigated the relationship that coping has with appraisal (in either adults or children) (Peacock and Wong, 1993; Ramirez-Maestre, 2008). One potential reason for this is that the psychological literature more generally has extensively documented the link between thought and action, between cognition and behaviour (Eysenck and Keane, 2000); that appraisal influences coping, is perhaps thus taken as a given.

To my knowledge, this study provides empirical evidence for the first time of the relationship between appraisal and coping reported by UK school children in real-world contexts. Positive appraisals are associated with greater use of approach coping strategies such as assistance seeking and cognitive problem solving. Thus children who perceived the exams or transition as a challenge were more likely to exercise strategies that enable them to actively engage with the unique demands that each pose. Likewise children who adopt this positive attitude towards stressors are significantly less likely to use avoidant coping strategies. It seems reasonable to assume that children who have appraised the potential for gain in a situation and believe that they have the resources to cope have no need to try and avoid the stressor, either cognitively or behaviourally.

Somewhat surprisingly however, negative appraisals are associated with greater use of *all* types of coping, both approach and avoidant strategies such as cognitive and behavioural avoidance. Although threat was expected to be associated only with avoidant coping strategies, it seems that children who perceive very little to be gained in a situation or perhaps even some sense of harm deploy all of the coping tactics available to them. Whilst approach strategies target the problem in hand, avoidant strategies are likely enacted by threatened children in an attempt to cope with the emotional ramifications of feeling threatened (Holen et al., 2012). This links to work by Lazarus (2000) and others (e.g. Ziegelmann and Lippke, 2009) indicating that in some instances emotion-focused coping, even in extreme forms such as avoidance and denial, can constitute an adaptive response.

The relationship between appraisal and coping was significant and it was possible to predict children's coping strategies from their scores on an appraisal measure. This study found that differences in appraisal explained approximately 10% to 30% of the variance in almost every type of coping strategy. This suggests that whilst there was a strong link between appraisal and coping, there are other significant factors that influence the kinds of strategies children deploy in an effort to manage the demands of stressors, such as individual characteristics or contextual factors (Sieffge-Krenke et al., 2009).

Given the manner in which secondary appraisal is conceptualised, we would have expected 'resources to cope' appraisals to be closely related to the types of coping

strategies that children reported enacting, for instance we would expect high levels of perceived resources to cope to be associated with approach coping strategies and low perceived resources to cope to be related to the use of avoidant coping strategies. This was not the case. In stark contrast to threat and challenge, resources to cope appraisals were a poor predictor of the particular coping strategies that children reported using in the context of the stressors under study. This is an interesting finding that is difficult to interpret. Given the ability of challenge and threat to predict coping strategies the relationship between appraisal and coping cannot be ruled out. However, perhaps at this pre-adolescent age the coping strategies that children rely on are more significantly influenced by other contextual factors such as the quality of their social relationships than their perception of their own ability to cope. Or perhaps children have a relatively narrow coping repertoire at this age (based on relatively limited previous experience) that they revert to in the context of challenge or threat and regardless of whether they believe they have the resources to cope.

Furthermore and unexpectedly, coping appears to have very little influence over mental health outcomes. Only assistance seeking at T2 and cognitive avoidance at T3 reliably predicted some variance in children's outcomes but this was the same variance that was already explained by appraisal. Comparable findings have been reported by Clarke (2006) in a review of the evidence for the relationship between approach coping and mental health; coping accounted for less than 2% of the variance in mental health. The findings of the present study, together with the results reported earlier with regards to resources to cope appraisal not predicting outcomes, suggest that coping is not a key mechanism in the relationship between routine stressors and children's emotions and behaviour. This conclusion (though caution is urged due to the methodological limitations of the study as reported later in this chapter) has implications for policy and practice. Many prevention and intervention programmes (whether purposefully or indirectly) are designed to prevent and manage children's stress responses through the facilitation of approach coping strategies (e.g. Carnevale, 2013; Clarke et al., 1990). The findings of this study suggest that interventions targeting children's appraisals and cognitive processing of stressors would translate into more effective services (more on this in *Chapter Nine*).

### **8.4.2 Appraisal and Cortisol**

As was explained in *Chapter Three*, healthy individuals naturally secrete cortisol in varying concentrations at different times of the day and the resulting circadian cycle plays an important part in synchronising bodily functions and maintaining homeostasis (Dallman and Hellhammer, 2011). However, the HPAA, of which cortisol is the end product, is sensitive to stress and produces extra quantities of cortisol to mobilise the body for fight or flight when a potential external threat is detected (Hellhammer et al, 2009). Therefore, before examining the relationship between appraisal and cortisol, it was essential to first determine whether the HPAA was responsive to the routine stressors under study.

### **8.4.3 The physiological impact of routine stress**

In order to detect whether children are physiologically reactive to exams and the transition to secondary school (and to rule out stable individual differences in basal cortisol secretion) mid-stressor cortisol levels were compared with cortisol data obtained at baseline. The results of the study as reported in *Chapter Six* suggest that children are not physiologically responsive to either exams or the transition to secondary school; cortisol levels, on all measures, remain stable between baseline and exams (T2). There is a slight increase between baseline and transition (T3), but this increase is not *statistically* significant and levels remain within the normal range for children of a similar age in the general population (Marsman, et al., 2008). Turner-Cobb (2005) cautions that the clinical significance of subtle changes falling within the normal range are questionable, indeed she questions whether “we are doing more harm than good in singling them out and running the risk of over interpretation of psychosocial effects on physiological responses, accompanied by over inflation of the implications?” (p.47).

Finding that the HPAA was not responsive to either the SATs exams or transition leads to questions about whether the HPAA is sensitive to routine stressors more generally and if not, why not? There are a number of factors that might explain the absence of significant relationships between the stressors under study and children’s cortisol levels. The first is that children are simply not physiologically responsive to routine stressors. They successfully adapt to the demands of these stressors within the parameters of basal HPAA functioning and thus do not display elevated levels of cortisol. The conceptual framework for this study was presented in *Chapter Two*, it describes a number of different stress

response processes that might explain individual differences in outcomes, of which HPAA functioning was one. It is entirely possible that HPAA is not a causal mechanism in the context of routine stress - we have already identified that appraisal is a significant predictor of variation in children's outcomes and these results suggest that appraisal operated independently of the HPAA in these contexts. The study also found striking evidence of specificity in the stressor-outcome relationship that would support the hypothesis that different stress processes operate in different circumstances.

There is also a developmental perspective to consider. Prior research has shown that younger children do display cortisol responses to a variety of different stressors including routine ones, such as their first school transition to primary school (Stanbury and Harris, 2000; Turner-Cobb, et al, 2008). The lack of HPAA activation in the context of the stressors in the present study that both occur later in childhood (KS2 exams and transfer to secondary school), could be interpreted as an indication that children have become physiologically 'toughened' to these kinds of expected, routine stressors over time (Carmichael, 2009; Seery et al., 2010). This is consistent with the findings of Diestenbier (1989) who suggested that neuroendocrine systems develop over childhood to limit responses to routine stressors.

A further reason for the lack of cortisol responsivity could be that HPAA is more significantly affected by the anticipation of a stressor rather than the experience of it. Studies have shown that anticipation of an event can be a potent activator of the HPAA; patients with phobias for example display largest levels of cortisol elevation on the day before being exposed to the stimulus that they are afraid of (Levine, 2000; Levine, 1990). For the purposes of this study the collection of cortisol data was timed to coincide with the experience of the stressor, rather than in anticipation of it.

Another possible explanation is that salivary cortisol is not sensitive to routine stressors. Indeed, it was proposed by Nicolson (2008) that salivary cortisol is not the gold standard biomarker for measuring physiological responsivity to stress, despite the widespread use of the technique. Furthermore, there are other hormones involved in stress physiology and a range of different methods for extracting them that could have produced different findings. A wide range of neurotransmitters, hormones and regulatory systems have

been implicated in the stress response (Allwood et al., 2011; Franklin et al., 2012); cortisol is just one hormone involved in one of these systems - the HPA. Increasingly researchers are interested in alternative measures, such as salivary alpha-amylase (Allwood et al., 2011).

The study's small sample size and consequent low statistical power might also explain the cortisol findings. Research involving small samples is particularly vulnerable to type II error (false negatives) - where statistically non-significant results are observed when in reality there may be significant relationships between the variables under study (Sarantakos, 2005).

Whilst there are no significant differences between any of the cortisol measures across time, there are progressively more children at each time point who can be described as having a flattened cortisol cycle during mid-stressor timepoints. The flat response is largely caused by the absence of a burst of cortisol that in healthy subjects is secreted in the first hour of awakening. The absence of this rise, technically referred to as an attenuated CAR, is usually associated with fatigue, burnout, exhaustion and post-traumatic stress disorder. However, there is some debate within the literature about what constitutes a healthy CAR and whether low levels of cortisol during the awakening response might also be associated with positive affect, happiness and optimism. Comparison of the mean scores of children in the 'no rise' or 'small rise' group with children who exhibit the typical diurnal pattern of cortisol secretion reveals that children with a flat response have greater emotional, behavioural and total difficulties. These differences, however, are not statistically significant.

Furthermore, Pruessner et al. (1997) in a study of 42 children found that a small group of them under the age of 10 demonstrated little evidence of a CAR, suggesting the possibility that this mechanism might develop during childhood at different rates for different children, thus the flat response observed in this study could result from physical developmental differences between the children in the sample. Furthermore, researchers have suggested that the most significant confounding variable affecting the cortisol awakening response is participant adherence (Thorn et al., 2009). As Clow et al. (2010) notes, the rate of cortisol secretion increases more than 100% within the first thirty

minutes of waking, and even small deviations from the saliva sampling instructions can have a substantial impact on the values obtained. In a number of recent studies that compared the cortisol profiles of adherent against non-adherent participants, researchers have reported that non-adherent groups have lower morning cortisol concentrations (see Clow et al., 2004). Although cortisol samples obtained under conditions that constituted a deviation from the protocol were excluded, those deviations were determined via self-report data collected from children and parents. The reliability of self-report in this context has been questioned in the literature and it is possible that there may be further non-adherence that has not been reported (Hellhammer et al., 2009; Inder et al., 2012; Jessop and Turner-Cobb, 2008)

#### ***8.4.4 The relationship between appraisal and cortisol***

Whilst children did not appear to be physiologically responsive to exams or transition, there was some indication that there are relationships between cortisol and appraisal. Different types of appraisal are correlated with different measures of cortisol at different timepoints. The pattern of these relationships is difficult to interpret and whilst some of the relationships are significant, regression analyses reveals that appraisal was not a significant predictor of variation in cortisol levels. Conceptually speaking, we would not expect appraisal to predict cortisol if the HPAA is not responsive to the stressor; appraisals are the product of the perception of external demands and the data from this study shows that the HPAA is not responsive to the particular external demands of exams and transitions. In essence, there is nothing for appraisal to predict.

The link between psychological and physiological processes though often theorised, has been notoriously difficult to evidence. The findings of my study are supported by arguments presented by Gotlib et al. (2008) and Sapolsky (2000) that the mind-brain connection is complex and should not be assumed to exist. There is an urgent need for further research on the link between appraisal and physiological stress systems. There is some evidence in the literature that threat and challenge are differentially related to the HPAA and SAM (Seery, 2011). Perhaps, as is indicated in systematic reviews (e.g. Dickerson and Kemeny, 2004; Gunnar et al., 2009) threat is key to activating HPAA responses and although threat was predictive of outcomes for at least one of the

stressors, the generally low levels of threat appraised by children in both contexts was not sufficient to provoke a physiological response.

Despite the fact that there appear to be some promising links between appraisal, coping and cortisol, the strongest predictor of children's psychological outcomes in routinely stressful situations appears to be their cognitive appraisals of the meaning, significance and value of the stressor in question. The study suggests that increasing positive appraisals and decreasing negative appraisals may be one way of achieving better outcomes for children and young people. This finding is likely to be of considerable interest to those seeking mechanisms through which to prevent children from succumbing to the risks associated with stress and trauma, as will be explored in *Chapter Nine*.

## **8.5 THE PRESENCE OF A POSITIVE APPRAISAL STYLE**

One of the aims of this research was to establish whether children display cross-situational consistency in their appraisal of stressors and to what extent that consistency might translate into better or worse mental health outcomes.

There is very little consensus within the literature about whether children have styles of appraising stressors that manifest across contexts and time (see *Chapter Five* for a summary of the debate). Arguments tend to cluster around the importance of objective context on the one hand (Ptacek et al., 2006; Trad and Greenblatt, 1990) and the influence of personality, beliefs and values on the other (Oliver and Brough, 2002; Tong et al., 2006). Whilst it is argued that appraisals are a product of an environment-person transaction and thus heavily determined by current contextual circumstances, the founder of transactional theory and developer of the appraisal concept himself acknowledged the possibility that individuals might demonstrate some consistency across contexts (Lazarus, 1991).

The findings of this study suggest a middle ground between these two conflicting perspectives. The majority of children in the sample were not consistent in the types of appraisals they made at baseline, exams and transition but there is one small sub-group of children ( $n = 13$ ) who were consistent across all three timepoints. They were consistent



in the sense that they repeatedly appraised stressors as very challenging (rather than threatening) and they perceived that they have large amounts of resources to cope.

### **8.5.1 Flexible appraisers**

It is important to note that whilst the majority of children do vary in the types of appraisal they make across contexts, negative appraisals and perceptions of threat remain both low and stable across time. This means that whilst the flexible group did not display consistency in the appraisal process, they were for the most part making generally positive appraisals. The difference is that those appraisals were not consistently high on both challenge *and* resources (as it is for the positive thinkers). Sometimes they comprised challenge and threat, or resources and threat, or just resources, or just challenge. This finding is congruent with research that shows that many people are optimistically biased (Sharot, 2011). On the whole people's beliefs about themselves and the world around them tend to be favourable and many have exaggerated perceptions of control and mastery and make positive self-evaluations (Block and Colvin, 1994; Park, 2010; Park and Folkman, 1997).

Furthermore, the prevailing view within the appraisal literature supports the notion that appraisals are highly context-dependent, comprised of specific meanings made in unique contexts and that consistency is therefore unlikely. Lazarus (1991) emphasises the role of stressor characteristics as antecedents of appraisal, including novelty, uncertainty or ambiguity and timing, as well as the specific demands or content of the stressor such as whether it is a performance-based task with the chance of social feedback, an interpersonal task, and so on. To a large extent the broader findings of this study lend support to this view and the notion of flexibility in the appraisal process. There appears to be a high level of specificity in the relationship between specific stressors, mediating mechanisms and children's outcomes. Appraisal in particular appears to lend itself to the specificity argument, with threat and challenge differentially predictive across various stressors. Nonetheless there are a small proportion of children, who contrary to the previous research just described, do display consistency in the appraisal process.

### **8.5.2 Challenge-oriented appraisal style**

These children are consistent positive thinkers, at all time points their appraisals are characterised as comprising high challenge and high resources to cope scores. This means that they consistently approach stressors with the attitude that there is something to be gained from the situation and that although they identify that some adjustment is required by the situation, they believe this is firmly within their coping resources and abilities.

Moderate levels of stability in appraisal have been documented in research on adults (Ferguson, et al., 2001; Hemenover and Dienstbier, 1996; Scherer and Drumheller 1992). Skinner and Brewer (2002) for example reported the presence of stable appraisal styles across several stressors. The capacity of children and adolescents to display consistency has been reported in a small number of studies conducted in the US (Hood et al., 2009; Power and Hill, 2009). Their findings are suggestive of consistency in the appraisal process as experienced by children, though they report that consistency was strongest on the threat dimension of appraisal. Conversely, the present study did not find consistency in threat appraisals, arguably due to the generally low levels of threat reported by the pupils in the sample.

This finding is significant because relatively little attention is paid to the potential for *positive* cognitive styles in the stress literature; relatively greater efforts have been made to explore the presence of negative cognitive styles and their relationship with clinical depression and anxiety (Seligman et al., 2004). These efforts span the boundaries between the stress literature and clinical psychology and are primarily driven by the desire to develop more effective treatments for these impairing conditions (Huppert and So, 2011). However, the rise in 'positive psychology' has given rise to renewed interest in concepts such as optimism and new interventions are being designed to foster these positive qualities in children (rather than alleviating their difficulties or focusing on deficits) (Fledderus et al., 2010).

In terms of the development of a challenge-oriented appraisal style, there were some interesting trends over time that provide clues to potential mechanisms. First, children in the sample as a whole perceived increasingly larger amounts of challenge and

progressively more resources to cope over the course of the year in which they were tracked. Moreover, increasingly larger numbers of children were consistent over time, data from T2 and T3 (excluding T1) reveals that there were four further children (n=17) who appraise high challenge and high resources across both exams and transition.

These findings could be interpreted tentatively as an indication that routine stressors are an important practice ground for children, they provide children with opportunities to learn and test out different ways of dealing with challenges and build more efficacious positive models of adaptation. Successful adaptation to a routine stressor might lead to increased levels of self-efficacy as well as a sense of achievement and mastery that has beneficial consequences for how children cope with future stressors, making them more likely to appraise demanding situations as a challenge.

This interpretation is supported by the findings of previous studies, including Seiffge-Krenke et al. (2010) whose study of 228 adolescents found that throughout their teenage years and into early adulthood, the adolescents “increasingly and competently dealt with tasks considered as salient” (p.503). It suggests that appraisal styles could be one mechanism through which the effects of ‘stressor inoculation’ or steeling carry forward in time and across contexts (Rutter et al., 2006). In *Chapter Three* several arguments were made in support of further research on routine stress on the basis that these stressors have potential to disrupt or promote functioning. Many of these arguments appear to be supported by the findings of the empirical study, though the small sample size and exploratory nature of the work on appraisal style suggests that the findings should be interpreted cautiously.

The children forming the positive thinker group mostly attended the same three schools. The four additional children who become consistent between T2 and T3 were also pupils from those three schools. This suggests that there might be something about what it is that these schools do to prepare their students for exams and the transition that helps them frame those particular stressors in a positive light. However, it could also suggest that there are social processes acting on children’s appraisals relating to an aspect of the school environment. It was not within the scope of this study to test the moderating role of several risk and protective factors identified in stress research, nevertheless these

findings are in line with previous studies documenting gender, age, school and social effects on children's responses to stress (Grant et al., 2006). Recommendations for further research that incorporates these demographic factors as co-variables in conceptual and statistical analyses are put forward later in this chapter.

### ***8.5.3 Flexibility vs. Appraisal style: what is optimal for children's emotions and behaviour?***

Despite the general positivity of both groups, there are differences in their emotional and behavioural outcomes, and general mental health. The consistent positive thinkers have significantly better outcomes (emotions, behaviour and total difficulties) at every time point than the flexible group. This might suggest that the real advantage of positive thinking is only experienced if it is applied consistently to all demanding situations.

This result stands in contrast to proposals within the literature that one of the key reasons that so many children display a capacity to emerge from stressors unscathed is their ability to flexibly respond to contexts and optimally match coping efforts to the demands of the situation (Ptacek et al., 2006). Recent years have seen an exponential growth in interventions designed to teach children 'mindfulness' as a way to improve their emotional outcomes (Weare, 2013). Mindfulness has been described as "the awareness that emerges through paying attention, on purpose, in the present moment, and non-judgementally to the unfolding of experience moment by moment". The emphasis is on greater flexibility and accuracy in appraisals as well as "less reactivity to whatever is taking place on a somatic, cognitive, affective, or behavioral level" (Duncan et al., 2009, p.256). Evidence from randomised controlled trials suggests that these approaches are largely successful in achieving the desired impacts on outcomes (Greenberg and Harris, 2012).

Moreover, whilst the results of this study suggest that a challenge-oriented appraisal style is something that can be learned, further research is needed in order to determine the developmental trajectory of appraisal style. Personality is shaped by many factors, such as genes, temperament and experience (Tong et al, 2006), some of these factors can be fostered and others cannot (Dweck, 2008). Thus, a question arises about whether helping people to adapt positively to stress requires them to be flexible, or to be inflexibly and

consistently positive as my study suggests. Is 'unscathed' what we should be aiming for? Could larger gains be achieved for children if more concerted efforts were made to encourage consistency in the positivity with which they think about and engage with routine stressors?

#### ***8.5.4 The absence of a threat-oriented appraisal style***

It is noticeable that none of the children in the sample displayed a tendency to regularly appraise stressors as threatening or as exceeding their resources to cope. A large body of evidence on cognitive aspects of depression and anxiety reveal that a threat-oriented appraisal style is most likely to be experienced by children experiencing psychological difficulties of a severity that reaches clinical thresholds for psychopathology (Hankin, et al., 2005). Thus it is possible that a threat-oriented appraisal style was not found because of the small size and non-clinical nature of the sample utilised in this study. It may also be accounted for by the presence of non-response bias in the methodology. The sample is relatively small and was constructed via opportunity sampling methods. It is plausible that children who are more likely to appraise routine stressors as a threat or who have a threat-oriented appraisal style opted out of participating in the study or dropped out at one or more timepoints.

The findings and the conclusions drawn from them thus far in this chapter must be considered in light of the limitations of the methodology adopted for the study. The relative strengths and weaknesses of the study are outlined in the following section.

### **8.6 THE STRENGTHS AND WEAKNESSES OF THE STUDY**

#### ***8.6.1 Weaknesses***

A significant limitation of this study is that there is no control group with which to compare the sample data. A control group serves to eliminate any potential confounding variables and in doing so increases the chances that the differences in outcomes observed within a study are caused by the experimental manipulation rather than to an extraneous variable (Vogt, 2005). The issue of control groups is particularly salient for research focusing on children's mental health. Ford et al. (2009) note that research participants have a tendency to report more psychological problems in the first round of data

collection than in subsequent ones (known as attenuation). They also note that random measurement error can result in a phenomenon known as regression to the mean whereby the low and high scorers on any scale tend to score closer to the mean over successive data collection timepoints. Furthermore, psychiatric disorders and psychological health in general has a fluctuating course and research has shown that children's symptoms can naturally decline over time even without active intervention (Ford, et al., 2007). Although it could be argued that one of the reasons for these 'peak and troughs' in children's mental health are partly related to the presence of routine stressors in their lives it is impossible to state definitively that the deterioration in mental health difficulties observed in this study during the exams and the improvements made at transition, are the result of the hypothesised stressors. At best the findings represent associations and the findings should be interpreted as promising but in need of further confirmation from experimental research.

Another important caveat concerns the ability to generalise the findings to the wider population. The sampling method employed to recruit children and their families to this project was convenience sampling. Largely because the population from which the sample was to be drawn was relatively small (a number of small rural primary schools all feeding into the same secondary school) and because the researchers anticipated difficulty recruiting families given the timing and nature of data collection procedures. As a result of this approach it was not possible to ensure that the participants were representative of the local and general population. The children in the sample are mostly white and live in a semi-rural area of south west England. Ethnic minorities were under-represented in the sample. Thus the ability to generalise the findings of this study to children nationally (or indeed internationally) is limited.

The study had a small sample size and thus it was not sufficiently powered to detect significant relationships in the variables under study. On reflection, participant numbers might have been boosted by organising seminars with parents instead of relying solely on letters for sample recruitment. Another related limitation is the likelihood that the study was subject to non-response bias. Due to the convenience sampling methods adopted in this study it is possible that the children who signed up to participate might be those children who are more likely to appraise stressors in a confident positive manner. There is

also a reasonably high attrition rate at the transition time point. Thus children who tend to think negatively about stressors may be under-represented in the sample. It is certainly true that there are low levels of threat appraisal at each time point; if threatened children do exist and are missing then whole sections of the normal distribution are not accounted for by the findings presented here.

The measures adopted for the study, especially in relation to cognitive appraisal, are also somewhat problematic. Transactional theorists such as Lazarus (1999) argue strongly in support of a qualitative approach to measuring appraisal on the basis that questionnaires are not the most appropriate method for investigating what people *think* and *feel* - their internal states. Questionnaires do not capture the subjective meanings that are made by an individual in the context of a particular stressor (Park, 2010). Folkman (1999) explains that "the most exciting insights my colleagues and I have gained have been through the analysis of narratives. Quantitative measures help, but the gold is in people's stories" (p.xii). Robinson et al. (1995) also propose that the rate of interaction between stressors and cognitions is more complex than is captured in the singular time data collection timepoints used in this study. This reflects the notion that appraisal is a continual, dynamic process. They suggest that diary and other methods for tracing interactions on a daily time-sampling basis might offer up richer information (Robinson et al., 1995).

Aside from the fact that there is some debate over whether it is appropriate to measure appraisals using self-report questionnaires, there are other limitations associated with the SAMA. It was originally developed and tested on a sample of adolescents from minority ethnic groups also described as having low socio-economic status (Rowley, et al., 2005). The measure has not been tested and validated for White British children, or those from high socio-economic status backgrounds, both of which are characteristics of the large majority of children in the sample for this study. It is worth noting however, that the subscales of the measure did prove reliable in this study (Cronbach alphas are reported in Appendix VI). Further research is needed to develop appraisal measures that are reliable and valid for more diverse populations as well as practical enough to be useful for rigorous research and practical application.

Furthermore, there are no thresholds for the SAMA that enable categorisation of the types of appraisal that a respondent has made. Different techniques were tested and relatively arbitrary thresholds were developed in order to analyse the data and test the hypotheses formulated in response to the research questions concerning appraisal style. This approach has not been robustly tested and the findings should be interpreted with caution. Furthermore, the appraisal style analysis is limited to three timepoints. Petersen (1991) explains that “when we try to access ‘style’ from just a few events, we run the risk of measuring not a personality characteristic but simply reality... if we increase the number of events for which attributions are made, then we should come ever closer to measuring psychological style” (p.6).

Whilst the study has several methodological limitations, it also has a number of significant strengths.

### **8.6.2 Strengths**

This is one of the first studies to deploy a prospective longitudinal design to explore questions about the impact of routine stressors on psychological outcomes. The study took place over the course of a year and included four data collection timepoints - a considerable undertaking for a PhD study. Although there is no control group, obtaining pre-stressor baseline data has enabled the researcher to statistically control for prior levels of symptoms (Grant et al., 2004).

This design also ensured that data was collected in real time, in the context of two naturalistic stressors occurring in children’s lives. The benefits of this over previous research designs include enhanced ecological validity and the reduction of bias associated with retrospective recall (McMahon et al., 2003). Furthermore, given the significant effort required from the child participants and their parents to complete data collection at already busy and typically hectic times for families, the sample recruited for the study is of a reasonably good size.

The questionnaires administered in this research are well-validated, rigorous and robust measures of the variables of interest, with the exception of the SAMA as discussed earlier. Though it is worth noting that in many previous studies of appraisal in children,



appraisal has been operationalised as a hypothetical construct or measured using the type of stressor as a proxy for type of appraisal (Grant et al., 2003; Tomaka et al., 1997).

The study makes several novel contributions to the literature, many of which result from the strengths of the methods employed.

## **8.7 NOVEL CONTRIBUTION OF THE THESIS**

This study, although constrained by several methodological weaknesses (as outlined in *Chapter Seven*), makes several novel contributions to the stress literature and offers new data on a number of under-researched issues in the stress and coping literature.

### **8.7.1 Routine stressors**

The present study is amongst the first research on cognitive appraisal in children to employ a prospective, longitudinal study of real-world stressors. Research on appraisal style has been concerned with children's appraisals of hypothetical stressors and physiological researchers have investigated responses to artificial stressors in laboratory settings (Brown, 1990; Cicchetti and Toth, 2005; McNamara, 2000; Schneiderman et al., 2005; Seiffge-Krenke, 1993; Shaw, 2003). The drawback of these approaches is that there is no guarantee that the conclusions drawn from such studies reflect how children appraise and respond to real-time, real-life stressors. "In duration, severity, and complexity, experimental stressors must fall short of the stressors of everyday life" (Coyne & Lazarus, 1980, p.148).

Furthermore, the study considers the psychological impact of routine stressors, a form of stressor largely overlooked by stress researchers (Fields and Prinz, 1997; Rossman et al., 1997; Ryan-Wenger et al., 2000). Although there is no control or comparison group, it was possible to determine whether these particular stressors are *associated* with changes in children's outcomes. These findings challenge traditional assumptions that routine or 'normative' stressors are innocuous or benign (Nikapota, 2002). Indeed, the study suggests that this form of stress can be both harmful and a positive stimulus in children's lives.

### **8.7.2 Empirical evidence of appraisal and outcomes**

Many studies examine general perceptions of the stressfulness of events and few directly measure appraisal in accordance with the conceptualisation proposed by the transactional theory of stress (Uchino and Birmingham, 2011). The current study is also one of only a small number that investigate children's appraisals of real life, naturally occurring stressors rather than hypothetical or retrospectively recalled stressors (Krackow and Rudolph, 2008). The study contributes evidence for the common assumption that appraisal influences the impact of stress on outcomes. It is possible that a retrospective study would not have revealed the degree of specificity in children's appraisals that has been observed in this study.

### **8.7.3 Appraisal style**

The findings of the study appear to tentatively support the proposition that appraisal styles can 'hijack' the appraisal process and result in a particular type of appraisal being made regardless of the particular characteristics of the stressor or the context in which it occurs. Studies of children's psychopathology have previously identified particular cognitive styles such as pessimistic attributional style and hostile attributional style (e.g. MacBrayer et al., 2003; Peterson and Steen, 2002) and demonstrated their respective links with depression and aggression. This study is amongst the first to provide a picture of children's general appraisal styles and their influence on emotions and behaviour in the context of routine, common stressors (Hood et al., 2009). The difference in emotions and behaviour between flexible and positive thinkers suggests an important role for appraisal styles in the stress process and it is recommended that greater investment should be made in researching children's appraisal styles.

### **8.7.4 An integrated approach to stress**

Although there are increasing calls for multidisciplinary studies of stress, there remain few studies that incorporate measures of multiple different stress response processes, spanning cognitive, behavioural and physiological dimensions of children's functioning (Glass, 2011). It is my understanding that at the time of writing there are none that do so in the context of the specific routine stressors under study - KS2 exams and transition to secondary school. The findings build a rich picture of the processes that mediate the relationship between stressors and outcomes and suggest that *cognitive processes* are of

particular importance for emotions and behaviour. It is possible of course that the other stress response processes studied have less predictive value in relation to emotions and behaviour but greater salience for other dimensions of children's functioning. Evans et al. (2013) explains the complexity in relation to biological stress response processes: "Physiological stress reactivity is frequently considered a single construct, often indexed by only one measure of physiological stress (i.e., heart rate). Yet, different indices of physiological stress do not always follow the same response pattern. Moreover, it is not known whether the same factors can be considered determinants of the different physiological stress indices" (p.1).

Although the study makes a series of novel contributions to the literature, there is a clear need for further research on stress in children and young people. A series of specific recommendations follow.

## **8.8 FUTURE RESEARCH DIRECTIONS**

### ***8.8.1 Replication study***

A replication study to address some of the methodological weaknesses of the approach adopted for this thesis and further test some of the conclusions drawn would incorporate the following design features. A larger sample, sufficiently powered, would be sought to allow greater confidence in the effects observed. Efforts would also be made to ensure the sample is representative of the larger sampling frame from which it is drawn, or the general population. This would confer greater generalisability of the findings (Sarantakos, 2005). Efforts to recruit and retain participants would be boosted and sufficiently resourced so as to address the non-response bias issues in the present study and to prevent the potential absence of children who make negative appraisals of routine stressors.

Thought would also be given to incorporating a control group, so that comparisons can be made between children who are exposed to particular routine stressors and those who are not exposed. One option might be to adopt a quasi-experimental design involving a matched control group of primary school children from Scotland, where the transition to secondary school happens a year later. The presence of a control group could allow cause

and effect relationships to be studied with greater confidence (McKillup, 2006). Ideally the length of the study would also be extended so that consistency in the appraisal process across multiple stressors could be examined more comprehensively.

Data on the demographics and other characteristics of the children in the sample would also be gathered and entered as co-variables in the analyses, to address the failings of this study to account for the role of gender, school effects, general cognitive ability, temperament and socio-economic status. For all of these factors there is some evidence that they moderate the stress response and it is possible that these factors explain additional variance or indeed drive the appraisal process (Grant et al., 2006).

The multidisciplinary approach of the current study is a real strength and this would be retained in the replication study. Though the present study did not find evidence of a role for cortisol in explaining variation in children's emotions and behaviour, there is a great deal of evidence in the wider literature to suggest physiological stress response systems influence children's psychological adjustment to stress (Azar et al., 2004; Granger et al., 1998; Smider, 2002). A future study would incorporate additional biomarkers of physiological stress. Since the present study was designed, several developments have occurred in the field and a number of additional hormones have been identified as reliable measures of physiological responsivity to stress (Evans et al., 2013).

Measures of child outcomes might also incorporate additional dimensions of mental health (such as hyperactivity, peer relationships and pro-social behaviour - all of which is already captured in the *Strengths and Difficulties Questionnaire*). Critically, however, measures would also include questionnaires that tap into 'positive mental health' outcomes. Much of the literature focuses on pathways through which stress 'gets into the body' and does harm, and this study is no exception (Cicchetti, 2000). The findings of the present study do suggest that routine stressors could have a positive impact on psychological outcomes, but the data is based on the symptoms of emotional and behavioural *difficulties*. It would be interesting to investigate whether stress has a different pathway to *positive* emotions and behaviour. The ability to do this in any future study depends on the availability of robust measurement tools to capture the extent to

which routine stressors have a role to play in the development of optimal functioning and positive mental health (Cicchetti, 2000; Huppert and So, 2011).

Finally, a mixed-methods approach would be adopted. A qualitative study would be designed to sit alongside the quantitative methods. This would explore the subjective meanings that children make in relation to the stressors under study for reasons described in the section below on future qualitative research.

### ***8.8.2 Additional ideas for future research***

One avenue for future research would be to examine children's own perspectives on the topic of stressor classification. The benefits of stressor classification lie in the ability to synthesise the vast stress literature and summarise what is known about specificity in the relationship between different types of stressors and outcomes. An agenda for future research on stressor classification was set down by Grant et al. (2004) and also by McMahon et al. (2003) in the form of a series of steps; "the first step would be to conduct structured interviews that assess events/circumstances as 'objectively threatening to the health or well-being of youth'. Then, lists of stressors can be generated and level of threat can be evaluated by external raters, taking into account the context of the stressor. Checklists can be developed for children of various ages and backgrounds, and norms can be established" (McMahon et al., 2003, p.449-450).

Comparative studies are needed to further advance our understanding of the cultural dimensions of stress. Previous research has neglected to study the importance of cognitive variables in adjustment to stressors across different cultural groups (Chang et al., 2003) despite evidence such as that provided by Chang (1996) for example that reveals differences in optimism and pessimism across eastern and western cultures. Cultural differences might also be an important factor in distinguishing between types of stressors and might therefore be factored into the process of developing a taxonomy or classification system. It is possible that experiences that might be defined as routine stressors in one culture vary from another (Petersen, 1991).

Qualitative studies are needed to provide greater understanding of the specific meanings associated with threat and challenge. What does threat and challenge *mean* to children?

What types of meanings, beliefs, and attitudes are these appraisals comprised of? Is threat, challenge and resources to cope too crude a categorisation? Research evidence suggests that aggressive, anxious and depressed children display cognitive styles that predispose them to perceive threat in difficult and ambiguous situations. However there is also evidence that the subjective meanings underpinning those threat-based cognitive styles vary with the consequence that different routes of intervention may therefore be appropriate (Muris et al., 2005). Further qualitative analysis of the appraisal process are clearly needed. "In the absence of transactional descriptions, we are in danger of losing the trees for the forest, and it is a struggle to assimilate the dynamic human significance of what is going on" (Lazarus, 1999, p.184). Qualitative methods would also be appropriate for exploring the schema content comprising a challenge-oriented appraisal style. Though it would be important to also explore the overlap with existing dispositional or trait-based cognitive styles such as optimism and pessimism.

Suggestions for future research on appraisal *styles* are two-fold. The first is for longitudinal studies to be designed in order to explore stability and inconsistency in appraisal styles over time and contexts. The study reported in this thesis was limited to three timepoints, and the literature in general on children's appraisal styles is very limited (Hood et al., 2009; Power and Hill, 2009; Roesch and Rowley, 2005). If conclusive evidence for the presence of appraisal styles can be provided, research efforts could reasonably turn to understanding both the antecedents and causes of those styles as well as the consequences for a broad range of psychological and social outcomes. It would be interesting, and from a clinical point of view critical, to identify particular stressors for which a positive appraisal style is maladaptive or a negative appraisal style is adaptive (Hood et al., 2009). Longitudinal studies would also give some insight into the extent to which a positive appraisal style leads to children 'self-selecting' their environments and thereby reducing their exposure to and/or the occurrence of stressors (Kendler and Baker, 2007).

The findings of this study have provided an insight into the influence of cognitive appraisal on children's emotions and behaviour in the context of routine stressors, an important topic for future research is to examine the role of appraisal in response to acute and chronic forms of stress (Folkman, 1997; Gass & Chang, 1989). Is it plausible that

positive appraisals such as challenge and resources to cope promote positive outcomes such as improved emotions and behaviour in the context of a sudden bereavement for example? Or do other dimensions of appraisal become salient? As noted by Smith and Kirby (2011) stress researchers may benefit from collaborating with emotion researchers to advance knowledge of the appraisal process and address research questions such as the one just posed. They explain that research on appraisal has occurred within two different disciplines in a “puzzling bifurcation in the scientific literature” (Smith & Kirby, 2011, p.396). Although studies of appraisal have occurred within the stress literature, the focus of empirical research has largely been on the *coping* process, whereas in the emotion literature appraisal has been studied extensively (Ellsworth and Scherer, 2001). In particular, advances have been made with regards to the structure and sub-types of appraisal (Smith and Kirby, 2009) that are salient in the activation of different types of emotion. Thus it has been argued that unifying the two approaches would provide a comprehensive framework for studying adaptation in the face of stress and adversity (Contrada, 2011).

Studies of the interaction between genes and environment are likely to figure largely in future research on childhood stress. Evidence suggests that genetics may influence the occurrence of stressors (via heritable traits and person processes such as ‘novelty-seeking’) as well as the responsivity of various stress response processes (both psychological and physiological) (McCaffery, 2011). For example, research has revealed that physiological stress response processes including the HPA axis are influenced by genes (Stenius et al., 2008; Steptoe, et al., 2009; Wüst, et al., 2000) and it has been suggested that some individuals may be predisposed to display greater sensitivity to specific types of stressor (Caspi & Moffitt, 2006; Rutter, 2006). Genetic research is still in it’s infancy and findings emerging from groundbreaking studies on the interaction between stress, genes and depression as well as antisocial behaviour are yet to be replicated (Caspi et al., 2003). Such studies are critical to the design of prevention and early intervention programmes designed to improve children’s emotions and behaviour in the context of stress. Cicchetti et al. (2011) argue that there are few, if any, examples of interventions that successfully improve outcomes for *all* of the children that receive them and part of this variation is likely to be explained by a genetic predisposition to greater sensitivity to particular stressors. Furthering our understanding of the complex interplay

between genes and environment could suggest the need for targeted interventions for high-risk populations and therefore lead to the implementation of more effective stress management interventions.

Greater investment in the development and testing of stress management interventions is also needed (as will be explored in *Chapter Nine*). One suggestion for future research could be to develop two interventions - one intervention designed to foster a flexible appraisal style and another to foster a challenge-oriented appraisal style. Both interventions could be evaluated in a head-to-head randomised controlled trial, revealing the relative benefits of one approach over the other as well as shedding new light on the differential impact of flexibility versus appraisal style on children's emotions and behaviour.

An experimental approach could also be adopted to test the proposition that stress management interventions could harness routine stressors as a training ground to help children develop adaptive ways of responding to future stress. The study would randomly allocate some children to receive a stress management intervention and others to a control group who do not receive the intervention and follow both groups up over the long-term. This kind of study would evaluate the effectiveness of the intervention and also provide evidence to support or refute the notion (proposed in *Chapter Nine*) that routine stressors can be harnessed as a training ground. The long-term follow-up data could be analysed to investigate whether positive appraisals lead to better outcomes in response to *subsequent* routine stressors. Such a study might also reveal whether the skills and qualities fostered in the context of routine stress increase the likelihood of children experiencing resilience to the risks associated by chronic and acute forms of stress.

## **8.9 CONCLUSION**

The findings from this study support the general belief that many children have the capacity to emerge the other side of routine stressors relatively unscathed. However, some children experience fewer psychological difficulties than others during the exam period and the transfer to secondary school.



This study tested children's cognitive appraisals in real-world conditions and found that differences in the way that they interpret and think about stressors directly affects the way that they psychologically adjust to those stressors. Children who perceive routine stressors as a challenge, that is within their capability to overcome, have significantly better mental health than children who have appraised the stressors as threats exceeding their resources to cope. These results suggest that the cognitive appraisal process is a strong candidate in the search for causal mechanisms that explain patterns of risk and resilience in response to non-routine, more acute stressors.

Furthermore, children who consistently appraise positively (i.e. those who perceive high levels of challenge and resources to cope across several different stressor contexts) have significantly better outcomes than children who only occasionally see the positives in a situation. The data further suggests that the development of a positive appraisal style might be mediated by a sense of mastery gained from overcoming previous stressors successfully, or perhaps by social processes operating at the peer and school level.

As one of only a handful of studies to investigate the extent to which children's appraisals are *consistent*, the findings of this study, if validated in future research, could have further significant implications for applied research, policy and practice. The study strongly suggests that appraisal is a key mechanism explaining individual differences in children's psychological outcomes in stressful contexts and is therefore a potential target for prevention, early intervention and treatment approaches designed to help children develop the capacity to adapt positively to stress. Further implications for policy and practice are addressed in the *Chapter Nine*.

## **CHAPTER 9: IMPLICATIONS FOR PRACTICE AND POLICY**

### **9.1 INTRODUCTION**

The empirical study within this thesis revealed that routine stress can be a force for both good and bad in children's lives; following these inevitable common stressors some children experience greater emotional and behavioural difficulties, whereas others appear to experience improved emotions and behaviour. The study also revealed that the cognitive appraisal process is a significant predictor of these differences, with challenge appraisals predicting better emotions and behaviour and threat appraisals predicting poorer outcomes. Though there are considerable methodological limitations to the empirical study and further research is needed, a series of recommendations are made in this chapter in support of a universal stress management training programme that capitalises on routine stressors to teach children how to make positive, self-efficacious appraisals and increase the chances that they will display resilience across a variety of different stressful situations.

The chapter begins by outlining the need for programmes that improve children's emotions and behaviour and the case for prevention and early intervention. The advantages of stress management over stress prevention are also outlined, followed by the implications of the present study for the design of stress management programmes. Messages from reviews of stress management interventions are examined, highlighting the absence of effective programmes that both target appraisal and utilise routine stressors as a learning context. Towards the end of the chapter a series of arguments are made in support of universal, school-based stress management and a series of suggestions for changes in policy that might facilitate growth in the design and implementation of such an approach.

### **9.2 EMOTIONS AND BEHAVIOUR: WHAT'S THE PROBLEM?**

The high rates of emotional and behavioural difficulties experienced by school children in the UK are a cause for concern (Weare, 2013). With one in 10 children reaching diagnostic thresholds for psychological disorders, it has been estimated that there are three children in every classroom experiencing these difficulties (Children and Young People's Mental Health Coalition, 2012). In a seminal study of time trends in children's mental health,

Collishaw et al. (2004) chronicled a downward trend in emotions and behaviour over a thirty year period, and follow-up studies suggest that emotional difficulties in particular continue to trouble increasingly more children (Maughan et al., 2008). As was outlined in the introduction to this thesis, emotional and behavioural difficulties are associated with educational and social disadvantage that will, for some children, persist into their adult years.

Efforts to improve outcomes for children are typically divided into the prevention, early intervention or treatment of problems - regardless of whether those problems are social, intellectual or indeed emotional and behavioural in origin (Lorion, 2000). A number of evidence-based<sup>42</sup> treatments have been developed to address the needs of 'high-need' children. Examples of effective treatment programmes specifically designed to improve children's emotions and behaviour include parenting interventions derived from social learning theory such as the Incredible Years and Triple-P parenting programmes (Mentinga et al., 2013; Nowak and Heinrichs, 2008), as well as ecological or systemic therapies such as Functional Family Therapy (Sexton and Turner, 2010) and Multi-Systemic Therapy (Henggeler and Schaeffer, 2010). Another notable example, of particular relevance to this thesis is Cognitive Behaviour Therapy that involves teaching "individuals to observe their cognitive and behavioral reactions to stress, to challenge distorted negative appraisals of self and the situation, and to replace distortions with more realistic, accurate, and positive appraisals" (Southwick and Charney, 2012).

Despite increasing knowledge about the most successful approaches for treating emotion and behaviour problems, many children who might benefit from these services do not access them; either because they receive untested treatments instead or because they do not receive any form of intervention (Stallard, 2010; Whitley et al., 2013). Treatment approaches are typically expensive to implement and rely on highly-skilled and experienced professionals: factors limiting the ability to implement them on a large scale (Shivram et al., 2009). Furthermore, for those who do go on to receive evidence-based treatments, it has been estimated that approximately 40% of them will remain non-responsive to interventions (David and Szentagotai, 2006). In other words, by the time

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<sup>42</sup> In this instance a robust evidence base refers to evidence gained from randomised controlled trials or quasi-experimental studies that suggest the intervention has a positive effect on outcomes.

they access services, some children's problems are so deeply entrenched that they are resistant to change (Neil and Christensen, 2009).

Research in the form of large scale epidemiological studies suggests that there are many children who experience milder emotional and behaviour difficulties, whose level of difficulty would not confer eligibility for the aforementioned treatment programmes and who as a result rarely receive any formal support (Brent and Weersing, 2008). Evidence for the continuity between mild difficulties and more severe disorders suggests that the provision of services for these children would be beneficial not only for children and their families, but also ultimately for the public purse (Knapp et al., 2011).

Thus, there have been several recent calls for greater investment in the development, testing and wide-scale implementation of prevention and early intervention approaches for the improvement of children's emotional and behavioural outcomes (Allen, 1990; Kraag et al., 2006; Luthar and Cicchetti, 2000; Neil and Christensen, 2009).

### **9.3 THE RELATIONSHIP BETWEEN STRESS AND CHILDREN'S EMOTIONS AND BEHAVIOUR**

Whichever approach is taken (prevention or treatment), reliable evidence of the causal pathways that lead to the problem at hand, as well as factors that confer vulnerability and resilience to such problems is critical in order to design effective programmes (Durlak, 1998). An expansive literature suggests that there are multiple pathways through which emotional and behavioural difficulties develop (Compas, 1997; Ford et al., 2004; Lau, 2002; Moffitt and Scott, 2008). This thesis was interested in the role that stress plays in children's emotions and behaviour. Previous research has revealed that acute stressors such as bereavement, injury, serious illness, abuse and neglect can have a significant detrimental impact on outcomes (Alexander et al., 2009; Berden et al., 1990; Compas et al., 1987; Flouri, 2008; Rowlison and Felner, 1988; Rutter, 2005; Timmermans et al., 2010). However, the findings of this study add to a growing literature advocating the connection between *routine* stress and children's emotions and behaviour. The findings suggest somewhat tentatively (bearing in mind the limitations of the study outlined in *Chapter Eight*) that routine stress can pose a risk to children's outcomes, but that it can also act as a force for good, providing opportunities for growth and improvement.

Thus, interventions that target children's ability to adapt successfully to stress "are seen as important components of mental health promotion" for children and adolescents (Fridrici and Lohaus, 2009). Throughout the remainder of the chapter an argument will be developed in support of universal stress management interventions, to be delivered at key transitional periods that promote the development of children's ability to appraise stressors as challenging and within their resources to cope with. This approach would harness routine stressors such as exams and transition as a practice ground for children to develop positive ways of responding to stress in all areas of their lives.

#### **9.4 STRESS: PREVENTION VERSUS MANAGEMENT**

One response to the detrimental effects of stress has been referred to as 'stress prevention' - that is the prevention of exposure to particular stressors or more generally to the experience of stress (Fridrici and Lohaus, 2009; Vierhaus et al., 2010). There are some stressors that society strives to eradicate entirely, such as child abuse, neglect and poverty. It would be difficult to argue against the pursuit of prevention approaches that limit the potential for children to grow up in an abusive, neglectful or impoverished living situation.

In many respects, however, stress is inevitable. Despite a natural instinct to shield children from adversity, it is not possible to fully eradicate stress from children's lives. Rutter (1987) explains "life involves unavoidable encounters with all manner of stressor and adversities. It is not realistic to suppose that children can be so sheltered that they can avoid such encounters" (p.326). Neither would this be desirable, since the prevention of stress does not necessarily equate to the prevention of emotional and behavioural problems. Indeed, researchers have noted that sheltering children from stress altogether could have adverse effects and even cause harm. Seery et al (2010) explain that "although sheltering from stressors may temporarily protect against distress, it should not result in long-term advantages. Sheltering provides no opportunity to develop toughness and mastery and is unlikely to persist indefinitely, so when stressors are eventually encountered individuals are likely to be ill equipped cope with them" (p.1026). (This research is described in more detail in *Chapter Three*).

Ultimately, dealing with stress is something that all people are required to do at different stages in life (Sandberg and Rutter, 2008) and coping successfully with routine stress appears to be an essential and positive feature of child development (Rutter and Rutter, 1993; Rutter, 2012). Thus, instead of trying to prevent most stressors from occurring, it has been argued that “the way ahead lies in ensuring that children encounter stressors at times and in ways that make it more likely that they will come out on top with a sense of accomplishment, rather than feelings of fear and humiliation” (Rutter and Sandberg, 1992). This approach is broadly referred to in the literature as ‘stress management’.

There are striking individual differences in children’s responses to stress. Some children experience greater emotional and behavioural difficulties, some children remain relatively unaffected, and other children appear to experience improvements in their emotions and behaviour following stressful experiences (Cohen and Hamrick, 2003; Cooper and Bright, 2001; Masten, 2001; Rutter, 2009). The study reported in this thesis found that this pattern of individual differences is observed in relation to routine stress - a form of stress previously deemed trivial and unlikely to even affect children’s emotions and behaviour. This finding, taken together with the broader literature, suggests that stress can have positive benefits for some children and that some individuals develop greater capacities for future resilience after successfully coping with stressful experiences.

This concept has been represented in the stress literature through the use of terms such as mastery (Caplan, 1981), steeling (Rutter, 2006), toughening (Seery et al., 2010), thriving (Meyerson et al., 2011) and stress inoculation (Roesch et al., 2002) and there are a number of empirically based examples, such as the *North American studies of children in the Great Depression* (see *Chapter Two*). At a broad level, the phenomenon has been likened to the medical concept of immunisation against infectious diseases (see Rutter, 2006). “Immunization works by tricking the body into believing it is experiencing a full-scale invasion by an infectious agent so that the immune system can fortify its defenses. During vaccination, a harmless version of a germ is introduced to the body and the immune system responds by producing antibodies to attack the intruder. Thereafter, a memory of this “invasion” remains so that the immune system can quickly recognize and neutralize disease-causing agents when they appear” (UNICEF, 2013). Thus successful

coping with routine stress might contribute to the increased chance of resilience to more severe life stress, through the progressive development of adaptive ways of managing and coping with stress.

## **9.5 ROUTINE STRESS AS A PRACTICE GROUND**

It could be argued that routine stressors offer opportunities for children to attain mastery, provided that they are equipped with the right skills and resources to navigate them positively. Seiffge-Krenke (2000; 2009) notes that children are exposed to a variety of different routine stressors as they grow up that they may have not experienced before. Thus, programme designers might develop services that utilise routine stressors as a ‘training ground’ for the development of qualities, skills and resources that increase the chances of resilience in the face of other and potentially more serious stressors encountered later in life, as and when they arise.

This would be somewhat akin to the kind of routine training that runners undertake in preparation for a marathon. “Runners do not run marathon distances to train for a marathon. Instead they run specific distances each day and increase that distance over the course of weeks. However, it is not until they actually run the marathon that they complete the full distance. Training within capacity does not lead to improvement rather progressive training develops the runner’s stamina or coping capacities” (DiCorcia and Tronick, 2011). Just as the runner does not complete the full distance before the marathon but gradually builds up to it, so it could be that successfully coping with routine stress increases the chances that children will be resilient to serious adversity.

Further support for this proposal might also be drawn from recognition of the importance of *experiential learning* for the acquisition of skills (Harrington and Clark, 1998).

Experiential learning has been described as “change in an individual that results from reflection on a direct experience” and the objective of experiential education to “seek to take advantage and maximise opportunities for experiential learning” (Itin, 1999 p.91).

Experiential learning is typical of stress management training programs for military, police and fire-fighter training (Southwick and Charney, 2012). There is also some evidence that this is the mechanism through which a number of outward bounding and camp experiences promote healthy development (Cason and Gillis, 1994; McKenzie, 2000;

Thurber et al., 2007). Rather than teaching children how to manage hypothetical stressors, an experiential stress management programme would involve guiding children to acquire and develop skills in an immediate, relevant and relatively safe setting.

Routine stressors such as exam periods and transitions are a potential site for such an intervention; they occur for a large majority of children at the same age and generally speaking resource is available to invest in helping children navigate such stressors smoothly (Evangelou et al., 2008). It has also been noted that many school-based stressors share qualities of other stressors experienced in other contexts and later in life (Brotman Brand and Weisz, 1988; Holen et al., 2012; Seiffge-Krenke et al., 2009). To illustrate briefly, exams share similarities with other performance-related tasks such as job interviews and the transition to school is in many respects a social task and shares similarities with going to university and moving to new neighbourhoods.

There are a number of advantages to such an approach. It could be argued that to minimise intrusion on children and families and maximise value for money, it is better to equip children with skills and capacities that have carry-forward effects. Therefore, stress management interventions should be organised around inevitable events and transitions that have a high rate of occurrence in the general population rather than less common stressors such as bereavement or abuse.

However, there are also risks with this proposal. Rutter (2012) warns there is a danger of de-skilling children, he explains “In whatever preventative approaches are used, there needs to be sensitivity to the danger of inadvertently deskilling the participants (whether they be young people or their parents) because professionals drive the whole enterprise, not just in strategic planning (which they need to do), but in the details of tactics as well. Of course, there is a fine line to be drawn between leaving everyone to their own devices (which is not likely to be a good option) and so regulating everything that there is no scope for participants to try out their own ideas and to learn from their own mistakes” (p.340). Thus programme designers will need to ensure that there are opportunities for children to have agency in the process of developing adaptive responses to stress.



It is also worth noting that the empirical research reported in previous chapters suggests that there is specificity in the relationship between stressors and outcomes, with regards to the direction of change in emotional and behavioural outcomes as well as the particular mediating mechanisms that predict variation in those outcomes. How can one stressor act as a training ground to promote the development of skills and strategies that increase the chances of positive adaptation to future stressors if the mechanisms that confer positive adaptation differ according to context? This issue will be explored in greater detail in the next section and it is proposed that cognitive appraisal appears to be a key determinant of outcomes in the stress process regardless of context and is likely therefore to be an appropriate target for intervention.

## **9.6 THE SIGNIFICANCE OF APPRAISAL FOR MANAGING STRESS**

It has been argued that school-based routine stressors could be harnessed as a practice ground in which to train children to develop adaptive responses to stressors in an effort to improve their emotions and behaviour. What should the focus of the training be?

Research on children's resilience to stress consistently highlights the significance of mental features and processes as a predictor of individual differences (Rutter, 2012). Specifically in relation to the cognitive appraisal process, Southwick (2012) explains that "when individuals believe that the demands of a stressful situation exceed their personal capabilities and external resources, they tend to appraise the situation as a threat and as out of their control, which negatively affects their emotional and behavioural response .... On the other hand, if the individual believes that they have the skills, experience and resources needed to successfully deal with an adverse situation, they are more likely to appraise the situation as a challenge" (Southwick, 2012, p.80).

The results of the empirical study reported here suggested that children's cognitive appraisals account for a significant proportion of variation in emotional and behavioural outcomes during periods of routine stress. Those who appraised stressors as a challenge generally experienced better emotions and behaviour than children who made threat appraisals. However, the findings were not straight-forward; threat and challenge appeared to be stressor-specific and 'resources to cope' appraisals appeared to have no relationship with outcomes. There are also methodological weaknesses that limit the

generalisability of the study (explored in detail in *Chapter Eight*). Nevertheless, given the strong theoretical arguments for the role of appraisal in the stress process, and growing empirical evidence in support of the process as a predictor of outcomes in children and adolescents, it could be argued that programme designers should focus stress management training on the appraisal process, and support children to develop positive appraisals in the face of stress.

### **9.6.1 Consistency versus flexibility**

One of the research questions for the present study related to whether children demonstrated consistency in the appraisals they make across time and context. It was hypothesised that most children would demonstrate flexibility (or inconsistency) and smaller numbers would display consistent styles of either threat or challenge for both exams and transition. The study found no evidence of a threat-based appraisal style. However, there is much empirical evidence to suggest that inflexible and negative thought patterns such as might be associated with a threat-based style, do exist and are a hallmark characteristic of serious psychological difficulties (Britton et al., 2011; Muris et al., 2005; Nay et al., 2003; Wenzel, 2004; Wenzel and Holt, 2003). Many successful services have been designed on the premise that breaking those patterns will lead to the reduction of symptoms.

Interestingly, the current study does suggest that there are a small group of children who *consistently* approach stressors with a positive appraisal style, and they have significantly fewer difficulties over time than children who appraise stressors flexibly. Thus, the question arises; if the aim of stress management training is to enable children to have the *best possible chance* of positive adaption to stress is it desirable to focus efforts on developing consistently and unfaltering positive appraisal styles? This would be a radical proposal; it suggests that we should train children to think positively regardless of the particular characteristics of a stressor and the context within in which it occurs. Although perhaps less radical if we consider that routine stressors are not intrinsically harmful in a way that more serious stressors such as abuse or neglect are.

The merits of this approach will rest on whether the findings in this study can be replicated in future research, as well as a better understanding of whether there are

some contexts in which thinking positively does not promote successful adaptation. Examples might include stressors that involve an element of victimisation that violate children's rights or the law, such as bullying and abusive relationships. We also need to know more about the reasons why some children appraise positively and others negatively and clearly we need more research on how positive styles develop. Further suggestions for future research on these issues are described and elaborated on in the conclusion to the thesis.

The notion of training children to develop a positive mindset for approaching routine stress has advantages from a practical perspective in the sense that it would equip children with skills that are applicable across a number of different potentially stressful situations and ideally transcend the particular context in which they are taught (such as during exams and/or transition).

#### ***9.6.2 Appraisal as an organiser***

Another theme in this thesis focused on cognitive appraisal as an organiser of other stress response processes, guiding in particular the types of coping strategies that children deploy and the release of the stress hormone cortisol. The study found that appraisal is a significant predictor of variance in children's emotions and behaviour but failed to produce evidence that appraisal has an organising role over coping and cortisol. Furthermore, coping and cortisol had no relationship with children's emotions and behaviour in the context of routine stressors. This is one of the first studies to examine these relationships and clearly further research is needed before firm conclusions can be drawn about the extent to which training children to develop positive appraisals would have consequences for their other stress response processes. However, similar findings are reported by Clarke (2006) who explains the "finding raises questions about the potential impact of prevention programs aimed primarily at promoting active coping. Because active coping alone does not explain much variance in psychosocial functioning for youth, even well-constructed coping skills programs may not result in large changes in adaptive functioning" (p.20).

## **9.7 HOW DO THESE RECOMMENDATIONS COMPARE TO EXISTING STRESS MANAGEMENT PROGRAMMES?**

As has just been argued, the findings of this study suggest that stress management programmes that target children's appraisals of stressors and that utilise routine stressors as an experiential learning context have potential to promote positive emotional and behavioural outcomes. How do these recommendations compare to current stress management programmes?

Two approaches to reviewing the literature on stress management interventions have been adopted. The first involved surveying the relatively small numbers of systematic reviews and meta-analyses focused solely on stress management interventions (SMIs) for children (Adi et al., 2007; Boekaerts, 1996; Kraag et al., 2006; Lister-Sharp et al., 1999; Weare and Nind, 2011). The second was to search the broad literature on prevention, early intervention and treatment of childhood problems and identify programmes that specifically target stress response processes (such as appraisal and coping) in an effort to improve emotions and behaviour (Nehmy, 2010; Neil and Christensen, 2007; Rickwood, 2011; Weare and Nind, 2011). The latter interventions might not be described as SMIs but have been labelled thus in the remainder of this chapter because they are similar to SMIs in terms of their desired outcomes and theory of change.

It is important to note, however, that the findings reported over the next few pages do not constitute an exhaustive review of stress management approaches. Prioritised interventions are those that: have been subject to randomised controlled trials or quasi-experimental studies; aim to influence key stress response processes (appraisal, coping and cortisol); that are designed to improve children's emotions and behaviour (or psychological health more generally); and have been published in the English language.

### ***9.7.1 Interventions that foster positive appraisals***

Reviewers have noted that large numbers of effective interventions are modelled on Cognitive Behaviour Therapy (CBT) (Weare and Nind, 2011). The fundamental premise of CBT is that behaviour and feelings can be modified by altering negative patterns of thinking (Lochman and Pardini, 2009). The direct link to appraisal as a stress response process is perhaps best summed up by Gonzalez-Prendes (2012): "Cognitive behavioral

therapy approaches are rooted in the fundamental principle that an individual's cognitions play a significant and primary role in the development and maintenance of emotional and behavioral responses to life situations. In CBT models, cognitive processes, in the form of meanings, judgements, appraisals, and assumptions associated with specific life events, are the primary determinants of one's feelings and actions in response to life events and thus either facilitate or hinder the process of adaptation" (Gonzalez-Prendes and Resko, 2012).

Cognitive-behaviour therapy has been shown to be highly successful at reducing serious emotional and behavioural problems through challenging the automatic and inflexible negative thought patterns that individuals experiencing those problems hold, thus the approach frequently deployed as a treatment programme or as a targeted prevention programme for children facing very specific and usually serious stressors (Brent et al., 2002; Durlak et al., 1991; Gonzalez-Prendes and Resko, 2012; Grave and Blissett, 2004). In the UK, CBT is recommended by the National Institute for Health and Care Excellence (NICE) as an effective treatment for anxiety and depression (NICE, 2005; 2013).

CBT is a general approach, and a number of programmes have been built on its foundations. Examples of CBT programmes targeted at children exposed to specific stressors include Trauma-focused cognitive behavioural therapy (TF-CBT). TF-CBT is a short-term treatment designed for children aged 3-18 years experiencing post-traumatic stress disorder and associated symptoms (PTSD) and/or emotional or behavioural difficulties resulting from a traumatic experience such as sexual abuse.

The programme aims to teach the child appropriate skills to help them overcome trauma. It works to improve subsequent emotional and behavioural responses through gradual exposure to non-threatening reminders of the trauma. Maladaptive beliefs are also corrected, e.g. in the case of abuse, the child's incorrect and maladaptive beliefs that he/she is responsible. TF-CBT is supported by a strong evidence-base, for example, research shows that children who receive TF-CBT display significantly reduced PTSD symptoms, both post-treatment and at follow-ups 6 and 12 months later, when compared to children assigned to alternative treatments (Deblinger et al., 2001). TF-CBT

has demonstrated effectiveness in reducing child depression, feelings of shame and behavioural problems (Cohen et al., 2005; Deblinger et al., 1999; King et al., 2000).

Another example of a CBT-based stress management intervention is Clarke and Lewinsohn's Adolescent Coping with Stress - a targeted prevention programme designed for adolescents at-risk of developing depression (Clarke et al., 1990). To be eligible for the programme eligible adolescents must have parents with diagnosed mental health problems. The programme teaches strategies to "identify and question negative, pessimistic and irrational thoughts related to their parents' mental health". It is delivered to groups of adolescents by trained therapists. A series of experimental studies suggest that it is successful in preventing depression (Clarke, 2006; Clarke et al., 1995; Clarke et al., 2001; Garber et al., 2009).

Studies have also revealed CBT to be effective when delivered as a *universal* prevention programme designed to promote children's ability to respond positively to stress (Carnevale, 2013). FRIENDS, for example, is an Australian prevention and early intervention programme designed to prevent childhood anxiety and depression. The programme teaches children various coping skills in order to reduce the likelihood that they will experience anxiety and focuses on skills to cope with challenging situations and everyday stressors. FRIENDS is an acronym for the specific coping strategies that children are taught to enact: F = feeling worried; R = relax and feel good; I = inner thoughts; E = explore plans; N = nice work, reward yourself; D = do not forget to practice; and S = stay calm (Essau et al., 2012; Fisak Jr et al., 2011).

Numerous studies have demonstrated the positive effects of FRIENDS (Barrett et al., 2006; Briesch et al., 2010; Dadds et al., 1999; Rodgers and Dunsmuir, 2013). It has been evaluated in the UK where it has demonstrated positive impact, in terms of increased self-esteem and reduced anxiety symptoms (Stallard, 2010). At present, FRIENDS is the only evidence-based programme endorsed by the World Health Organization for the universal and targeted prevention of anxiety in children and adolescents (World Health Organization, 2004).

A commonality across all of these CBT programmes is teaching children to anticipate typical reactions to a given situation and be prepared to counter them with a more rational and adaptive response (Fisak Jr et al., 2011; Rutter, 2010; Southwick and Charney, 2012; Stallard, 2010). Reviewers describe another collection of interventions that work in a similar fashion; attention control interventions. One example of an attention control intervention is Mindfulness Based Stress Reduction (MBSR) (Burke, 2010). 'Mindfulness' is a secularised contemplative practice that is partly based on meditation practices from the Buddhist tradition (Burke, 2010; Greenberg and Harris, 2012; Warren Brown et al., 2007). Essentially, mindfulness involves paying greater attention to and awareness of the present moment, as opposed to automatic or habitual cognitive processing that usually governs human responses to circumstances and events (Schmertz et al., 2012; Warren Brown et al., 2007). Warren Brown (2007) further explains that "fuller awareness afforded by mindfulness facilitates more flexible adaptive responses to events, and helps to minimise automatic, habitual, or impulsive reactions" (p.223).

MBSR typically comprises weekly group sessions and home practice, during which time participants engage with a curriculum of contemplative practices taught by mindfulness teachers. The intervention involves a mixture of psycho-education, guided meditation practices, and group discussion (Jones, 2011; Rybak, 2012). The research to date suggests that when implemented as a clinical and/or targeted intervention, mindfulness training results in decreased rates of absenteeism, hostility, poor behaviour at school and exclusions (Burke, 2010; Weare, 2013). When targeted at youth with academic problems and learning disabilities it results in improved emotional and behavioural wellbeing and academic performance (Mychailyszyn et al., 2012; Warren Brown et al., 2007). MBSR appears to be effective for children in outpatient care (Greenberg and Harris, 2012). As of yet, there have been few studies of MBSR when implemented with universal populations. Greenberg (2012) notes that pilot studies of a *universal* school-based mindfulness intervention suggest it can be effective in reducing negative affect and self-report levels of calmness and relaxation.

Attention control interventions and CBT-based programmes both focus largely on cultivating greater *flexibility* in the appraisal process and breaking negative styles of

thinking. They train children to be deliberate in their appraisals of stressors and to adapt to the demands of the situation. Southwick and Charney (2012) state that these approaches would be particularly helpful for the pessimistic or depressed individual who tends to preferentially focus on, remember, ruminate about, and have difficulty disengaging from negative-information” (p.81). Thus they are particularly appropriate as a treatment for negative appraisal styles (although negative appraisal styles were not found in the current study).

There are few examples of stress management interventions designed to cultivate *less* flexibility and greater *consistency* in positive styles of thinking. Relatively more is known about how to break inflexible thinking patterns (i.e. CBT) than about how to nurture them. Nevertheless, promising evidence is emerging from research on interventions designed to transform children’s implicit theories about the nature of intelligence. Research by Dweck et al. (1995) suggests that children generally hold one of two different theories about the nature of intelligence. The first is that intelligence is fixed or unchangeable and the second is that intelligence is malleable. Dweck refers to these theories as ‘fixed mindsets’ and ‘growth mindsets’, respectively and her research suggests that they influence children’s responses to academic stressors. In a series of experiments, Dweck’s research team have demonstrated that interventions designed to transform fixed mindsets into growth mindsets results in improved academic performance (Blackwell et al., 2007).

Although these studies focused specifically on children’s responses to academic stressors, they do suggest that it is possible to improve outcomes through fostering a positive *style* of thinking, Dweck (2008) explains that the interventions “yielded surprisingly large changes with seemingly modest input, and contrast with many large, costly interventions that yielded little or nothing. They follow in the footsteps of earlier attribution interventions, which changed people’s explanations for events and by doing so changed their reactions to them. These interventions all speak to the effectiveness of targeting beliefs that lie at the heart of important motivational, self-regulatory, and interpersonal patterns” (p.393).



### ***9.7.2 Multicomponent interventions that target multiple stress response processes***

It has been argued that one of the mechanisms through which cognitive-change interventions such as CBT and MBSR achieve impact is that by increasing positive appraisals, physiological stress responses are attenuated and more adaptive coping strategies are adopted (Boekaerts, 1996; Southwick and Charney, 2012). In the case of Mindfulness Based Stress Reduction, for example, Greenberg and Harris (2012) state that the intervention might “alter organisation and action of neural circuitry, which is associated with alterations in stress reactivity and immune function” (p.161). Although many of the aforementioned interventions focus on cognitive change, there are a number of multi-component interventions that target appraisals, coping and physiological responses simultaneously. FRIENDS is one example, it has three components a) a behaviour component that involves developing plans for coping and problem-solving; b) a cognitive component that involves teaching children how to develop positive self-talk; and c) a physiological component that focuses on teaching children relaxation strategies (Attwood et al., 2012; Briesch et al., 2010).

There are also a collection of interventions grouped together under the heading of Social Emotional Learning (SEL) that might be described as multi-component interventions (Durlak et al., 2011). SEL has been defined as “the process of acquiring core competencies to recognize and manage emotions, set and achieve positive goals, appreciate the perspectives of others, establish and maintain positive relationships, make responsible decisions, and handle interpersonal situations constructively” (Durlak et al., 2011, p.406). The theory of change for many SEL programmes suggest that they work, at least in part, through helping children to regulate their psychological and physiological responses to stress. This includes fostering positive appraisals of stressors, developing coping strategies and learning to identify and regulate physical (and emotional) responses to stress (Elias et al., 1997; Collaborative for Academic, Social and Emotional Learning, 2005). SEL programmes are typically delivered in a universal format in primary schools and by teachers using a specifically designed SEL curriculum. A recent meta-analysis (Durlak et al., 2011) suggests that these programmes lead to improved behaviour (both a reduction in conduct problems and an increase in pro-social behaviours) and improved emotions as well as academic performance.

### ***9.7.3 Interventions utilising routine stressors***

There are many examples of stress management interventions designed to improve children's outcomes in the context of specific stressors or events, though very few meet the standards of evidence outlined earlier in this chapter. These programmes are rarely theory-driven and very few are designed to directly affect appraisal, coping or stress physiology (Robinson et al., 1995).

There are, however, a number of interventions based on CBT designed for children exposed to specific stressors (Harrington and Clark, 1998). These programmes typically benefit children at one point in time in one specific context. To a degree, the findings of the present study support stressor-specific approaches. The children in the sample responded differently to two-school-based stressors, both in terms of how they appraised these stressors and their emotional and behavioural outcomes. Arguably however, interventions that promote positive appraisals in either context would have a good chance of promoting positive outcomes. In the case of exams, such an approach might reduce the large number of children who experience difficulties, and in the context of transition it might maximise the positive benefits the majority of children appear to receive. Furthermore whilst stressor-specific interventions clearly have benefit for particular groups of children in the context of particularly traumatic stressors, it has been argued that "interventions that focus on helping children adapt to single adversities do not typically address concurrent life stressors or prepare them for future adversities" (Cicchetti, et al., 2000).

There appear to be few examples of interventions that teach children transferable skills - that would help them respond positively to other events and future stressors that they will inevitably experience, and fewer still that utilise routine stressor as a context to teach those skills. Meichenbaum's (1985) stress inoculation training (SIT) could provide a structure for such a programme. SIT is based on CBT and has three component parts (Meichenbaum, 1996). The first involves preparing children to confront stressors and in some circumstances might involve reconceptualising stress/stressors as addressable rather than uncontrollable or overwhelming (Hains, 1992). The second phase involves helping the child develop effective coping skills both psychological (such as self-reinforcement and cognitive restructuring) and physical (such as muscle relaxation)

(Fontana et al., 1999). The third and final phase of SIT is helping the subject to apply their new skills in stressful situations (Rutter, 2006).

SIT has been for the most part implemented with adult participants and usually as a treatment for anxiety or phobias (Fontana et al., 1999). Kraag et al. (2006) noted that evidence in support of the application of SIT as an anxiety prevention programme for children and adolescents is promising. One controlled trial for example found the approach to be effective; young adolescents randomly allocated to receive the stress inoculation training showed decreased anxiety and stress-related somatic symptoms such as sleep problems or headache, when compared to a control group (Kiselica et al. 1994).

#### ***9.7.4 Interim summary***

To briefly summarise then, there are a number of proven programmes for cultivating positive appraisals, but these are largely targeted or treatment approaches (Boekaerts, 1996). There are few examples of universal prevention programmes and a lack of evidence-based programmes (EBPs) utilising routine stressors as an experiential learning context. There are also few examples of school-based interventions. Many of the successful programmes described are delivered in clinical settings, or by trained therapists.

Reviews have drawn attention to the significant methodological weaknesses of studies evaluating stress management approaches, most commonly including small sample sizes, the lack of experimental methodology and the lack of standardised reliable and valid outcome measures and a general absence of follow-up data (Calear and Christensen, 2010; Kraag et al., 2006; Mychailyszyn et al., 2012; Weare and Nind, 2011). It is also striking that very few programmes have been designed in the UK and of the relevant evidence-based programmes that have been implemented here, emerging studies suggest that they do not transport successfully (Little et al., 2012).

Thus it could be argued that further research comprising design and testing of a stress management training focusing on the acquisition of skills to make positive appraisals and that utilises routine stressors as a learning context is needed. In the next section it is

proposed that the focus could be on the development of a universal approach to be delivered in schools.

### **9.8 A UNIVERSAL APPROACH TO STRESS MANAGEMENT**

Many children's services are targeted at high-risk individuals or designed to treat children experiencing significant difficulties. There is no doubt that these services are important, as Axford (2008) notes, society has a commitment to provide aid to children in greatest need such as those with significant impairments to their development. This thesis, however, is focused on the impact of routine stress, which is unlikely (in isolation) to cause *significant* detriment to children's emotions and behaviour (as confirmed in the empirical study). Instead, we are talking about the limits of normal functioning - the average or typical child. "Programmes that promote coping with normative stress, delivered to the whole population, have been considered to represent a promising direction for the prevention of social emotional difficulties" (Hains, 1992). There are a number of arguments in support of a universal approach to stress management training.

First, it is not possible to prevent all stressors from occurring, they are in all respects inevitable. Furthermore as my study indicates, the majority of children are affected by even the most common and inevitable of stressors, thus it could be argued that we have a duty to provide all children with (and they have a right to expect) support that helps them to adapt to stress, regardless of their risk status.

Second, even supposing that routine stressors have only very small or modest effects on children's outcomes, those small effects can have larger implications (Brent and Weersing, 2008). Particularly in instances where large numbers of children are exposed to a particular stressor (as is generally the case with routine stressors) (Chung et al., 1998). "A universal prevention programme may relieve the distress and impairment of sub-threshold depression that might otherwise go unnoticed and/or untreated. Children and adolescents with sub-threshold depression still burden the health care system and their families and are considered at higher risk of future disorder and related problems" (Harrington and Clark, 1998).

The third argument for a universal strategy towards stress management training suggests that such an approach would have positive implications for those children in greatest need. Public health approaches to prevention suggest that improving the situation for the average child will help reduce the number of children who experience emotional and behavioural disorders (Goodman and Goodman, 2011; Rose, 2008). Huppert (2009) explains that “a very small shift in the population mean in the underlying symptoms or risk factors can do more to enhance well-being and reduce disorder than would any amount of intervention with individuals who need help” (p.108). The mechanics of this strategy work on the basis that the number of people diagnosed with disorder are directly linked to the average levels of underlying symptoms in the general population because mental health outcomes operate on a continuum.

This point can be illustrated using aspirin as an example. The association between regular doses of aspirin and reduced risk of heart failure in middle aged men is incredibly small (effect size 0.06) but nevertheless significant. If all middle aged men are prescribed aspirin, for the most part there is no benefit, but small numbers will experience life-saving benefits (Morgan, 2010).

Fourth, by definition universal programmes serve large numbers of children and as Frydenburg et al. (2004) explains “many more children might benefit at some time in the future if they acquired a wider range of skills and competencies to enable them to respond to future stressful and challenging situations in ways that protected their own well-being” (p.118). There is an advantage because there are some children who may not be identified as ‘high-risk’ who do go on to develop serious mental health problems. Conversely, it could also be argued that “the majority of those children receiving such approaches do not, and will not, require such interventions. This raises a resource issue as to whether universal prevention is the best use of limited resources” (Stallard, 2010). The counter-argument could be that although children might not have gone on to develop serious difficulties, without the intervention there remains uncertainty over whether they experience optimal functioning (Greenberg and Harris, 2012).

Fifth, a universal approach designed to enhance children’s skills, strengths and personal resources is likely to increase the number of children who not only fail to succumb to the

risks associated with stressors, but who actually begin to thrive in such contexts. The public health theory described earlier is likely to have consequences for the other side of the mental health spectrum by increasing the number of children who experience very good emotional and behavioural outcomes (Huppert, 2009) as well as reducing the number who experience significant problems.

There is growing discontent with deficit reduction approaches that prevent or reduce disorder, and increasing interest in strengths-based approaches that do not just fix problems but actually nurture what is 'best'. The latter might be considered a mental health promotion approach. Rickwood (2011) explains that "mental health promotion aims to maximise the ability of children, youth, adults and older people to realise their potential, cope with normal stresses of life, and participate meaningfully in their communities" (p.40). It is argued that prevention of disorders and promotion of well-being go hand in hand and a universal strategy could achieve both prevention and promotion aims (Kalra et al., 2012).

Sixth, there are several practical advantages to be gained from a universal approach. Universal programmes have been described as more sustainable, easier to implement in community settings where programmes are typically delivered by existing providers such as teachers and school counsellors as part of their routine services and therefore less expensive than targeted approaches (that are usually delivered by specially trained and experienced mental health professionals) (McLaughlin, 2011). The particular advantages to universal programmes implemented in schools will be explored in more depth in the next section of this chapter

Seventh and finally, the evidence base for universal prevention programmes suggests that the approach offers a very good chance of achieving positive outcomes for children. A plethora of systematic reviews of school-based prevention programmes have explored the effectiveness of both universal (Adi et al., 2007; Caelear and Christensen, 2010; Fisak Jr et al., 2011; Hahn et al., 2007) and targeted/indicated approaches (Greenberg et al., 2000; Reddy et al., 2009; Shucksmith et al., 2007; Sklad et al., 2012; Weare and Nind, 2011). In a meta-analysis of 35 studies investigating the impact of universal prevention

strategies on anxiety disorders, the results suggest that such universal approaches are effective and benefit all children (Fisak Jr et al., 2011).

However some reviewers have noted that universal programmes have relatively negligible effects on emotional and behavioural problems, especially when compared to indicated or selective approaches (Rivet-Duval et al., 2011). Weare and Nind (2011) describes “in terms of specific impacts there was a small to moderate impact of universal interventions on positive mental health, mental health problems and disorders, violence and bullying, and pro-social behaviour. In all these areas, the effects of interventions was dramatically higher, and quite strong, when targeted at higher risk children” (Weare and Nind, 2011).

Reviewers have accounted for these findings by referring to the ‘ceiling effect’ which stipulates that populations without overt problems do not have the same scope for improvement (Weare and Nind, 2011), in other words that there is greater room for change in individuals who present with symptoms and difficulties (Neil and Christensen, 2009). It has also been argued that universal programmes may have more impact on positive aspects of mental health than negative aspects. For example one randomised controlled trial study of an Australian universal prevention programme (Resourceful Adolescent Program) reported that significant reductions in depression symptoms experienced immediately post intervention were not maintained at 6 month follow-up (Rivet-Duval et al., 2011). The programme did however have sustained positive effects on self-esteem for a large majority of the intervention group.

It is important to note that the pursuit of prevention and early intervention should not replace programmes to treat the problems of high-need children altogether. There are a number of arguments that could be made in support of a public health approach to children’s mental health that incorporates a blend of universal prevention, early intervention and treatment. Many successful evidence-based programmes include modified programmes for treatment, early intervention and prevention (Winslow, 2006). Nevertheless the findings of this study support arguments for universal intervention and I would also argue point to the role of schools as a key provider of universal stress management training.

## **9.9 SCHOOLS: AN IDEAL CONTEXT FOR THE DELIVERY OF UNIVERSAL STRESS MANAGEMENT PROGRAMMES**

Ford and Ramchandani (2009) describe the mental health of children as ‘everybody’s business’; children with mental health problems often end up having contact with all of the major public services including youth justice, health, and education as they mature and get older. Nevertheless, it has been suggested that schools are specifically, uniquely and ideally placed to take responsibility for the emotional and behavioural wellbeing of their students (Fridrici and Lohaus, 2009; Reback, 2010; Weare and Nind, 2011). First, and as Brent and Weersing (2008) argue, tertiary mental health services face a number of system-level barriers that result in a lack of capacity to identify early and intervene. System-level barriers include low numbers of qualified professionals, inadequate funding, and long waiting times (Brent and Weersing, 2008; Mychailyszyn et al., 2012).

Second, there is an intuitive logic to embedding universal programmes that aim to improve ‘normal functioning’ within routine settings and processes (Cicchetti et al., 2000) and within which the target group is located (Frydenburg et al., 2004). For many concerned parents, schools are the first port of call for parents with regards to their children’s emotions and behaviour (Vostanis et al., In press) and furthermore, “teachers and other school personnel are often the first to observe behaviours that indicate either the development or worsening of mental health problems” (Whitley et al., 2013). It has also been observed that many sources of stress for children originate from the school context (de Anda et al., 2000). De Anda et al. (1997) for example, found that school-based stressors are the most frequently reported stressors for older children and adolescents. Thus it could be argued that schools have a responsibility to provide access to stress management interventions.

Third, schools have unparalleled access to children during crucial stages of their development. As children get older it becomes more difficult to change maladaptive thoughts and behaviors that often underpin the symptoms of emotional and behavioural difficulties and in some cases children can grow up to be treatment-resistant (Fisak Jr et al., 2011). “Programs for enhancing children’s well-being should occur early. The efficacy of such interventions will be greater if they occur as individual competencies and social structures that promote well-being are developing, rather than later, when competencies



may be lacking and dysfunction may be more deeply rooted” (Cicchetti et al., 2000, p.137). As a place of learning the school environment is an ideal context to facilitate the acquisition of stress management skills (Neil and Christensen, 2009; Southwick and Charney, 2012) “school-based interventions that integrated into the school curriculum were more effective in the teaching of skills (in terms of more and longer-term impact) than interventions that stand-alone” (Weare and Nind, 2011).

Fourth, it has been reported that children (and adolescents in particular) have generally low levels of interest in issues of health and stress and as a consequence recruitment and retention rates for voluntary programmes and services in community settings are typically low (Fridrici and Lohaus, 2009). By contrast, it is a statutory requirement that children engage in education between the ages of 5 and 16, with the large majority attending mainstream schools where teaching staff have unparalleled contact.

Fifth, it has also been argued that participating in programmes at school potentially reduces the stigma and labelling that might be attached to accessing services provided by other specialist mental health providers (Fridrici and Lohaus, 2009; Nehmy, 2010; Neil and Christensen, 2009). Caelear et al (2010) suggest that “although there are a number of benefits associated with selective and indicated programs, school administrators often prefer universal interventions. This preference likely stems from the broad application of universal programs and the reduced stigma and time associated with them, as the screening of participants is not necessary” (Caelear and Christensen, 2010).

Sixth, universal programmes can in many cases be integrated into existing structures and systems, perhaps delivered by teachers within personal development lesson times. It is often possible, for example, to accommodate programmes within lesson time, school curriculums and assemblies (Neil and Christensen, 2009). In addition to teachers, schools are staffed by a range of professionals that could deliver interventions, such as teaching assistants, higher level teaching assistants, schools nurses and counsellors (Coalition, 2012). Furthermore, research on universal interventions suggests that teachers are as, if not more, effective than specialists in the delivery (Vostanis et al., In press). The relative ease with which programmes can be embedded in schools has two important

consequences; it improve rates of accessibility for those children who are in need of services (Fisak Jr et al., 2011) and contributes to keeping the costs of those services low.

Finally and arguably most importantly, the literature suggests that schools have a vested interest in the emotional and behavioural health of their pupils. As described earlier in this chapter, approximately three children in every classroom have an emotional or behavioural difficulty, and it is highly likely that several more children will display the symptoms of milder problems (Green et al., 2005). This is concerning when set against the context of a large volume of published studies documenting links between emotions, behaviour and academic attainment (Children and Young People's Mental Health Coalition, 2012). Mental health problems are associated with poorer results on standardised test scores, lower school grades, and low levels of persistence with academic tasks, poorer school attendance and an increased risk of school drop-out (Kalra et al., 2012). Furthermore, poor mental health not only interferes with an individual child's own learning, but also impacts upon other children's learning and the ability for a teacher to effectively instruct and manage a class. Stallard (2010) states that "the UK mental health survey found that children with emotional disorders (e.g., anxiety and depressive disorders) were three times more likely to have a specific literacy problem than those who had no mental health disorder. Similarly, in terms of attendance, approximately half of those with an emotional disorder had missed some school days the previous term, compared with one third of those without an emotional disorder" (Stallard, 2010).

## **9.10 WIDER POLICY IMPLICATIONS**

Thus far in this chapter, arguments have been made in support of universal stress management interventions as a means to improve children's emotions and behaviour. Particularly those that capitalise on routine school-based stressors as an experiential learning context in which to teach children how to develop positive, self-efficacious appraisals of stressors. These recommendations are made somewhat tentatively given the methodological limitations of the present study, but nevertheless reflect the empirical findings reported in previous chapters, and messages in the broader literature about effective stress management interventions. It has also been noted that a number of pre-existing school-based programmes, though not labelled as SMIs, have been shown to

be effective in improving emotions and behaviour through the targeting of key stress response processes, examples included PATHs and FRIENDS.

There is an increasing emphasis on the role of schools in preventing mental health problems and promoting positive mental health (Vostanis et al., In press; Weare and Nind, 2011). This is reflected in a number of policy directives from the UK Government (Frydenburg et al., 2004; Gonzalez-Prendes and Resko, 2012), including Every Child Matters, National Healthy Schools, Targeted Mental Health in Schools and the Common Assessment Framework. There are very many school-based mental health interventions currently in operation in the UK and a recent large-scale survey of English schools found that efforts are largely focused on social and emotional skills development; creative and physical activity; and behaviour for learning and structural support (Vostanis et al., In press).

Despite the widespread presence of school-based mental health provision, few of the services offered in the UK, or elsewhere are evidence-based. A number of online databases have been constructed to increase awareness of and provide information on those programmes to commissioners, funders, practitioners and policy-makers (e.g. What Works Clearinghouse, National Registry of Evidence Based Programs and Practices, Blueprints for Healthy Youth Development and Investing in Children). Despite these developments, it has been suggested that many schools are simply not aware of evidence-based programmes and in many cases fail to choose them over alternatives (Durlak et al., 2011). Vostanis (in press) notes that only one third of English primary and secondary schools report using evidence-based programmes.

Almost all EBPs originate from the US and increasingly from Australia. Evidence for their effectiveness comes from research trials conducted under tightly controlled conditions and although many of them are manualised, technical support for real-world implementation is not forthcoming (Vostanis et al., in press; Zins, 2001). The result of this is that even when EBPs are adopted, levels of implementation fidelity (faithfulness to the programme design as set out by programme designers and evaluators) are generally low. Hahn et al. (2007) argues “fidelity can be a substantial obstacle to program success, and may be particularly problematic when implemented by communities without

investigation or scrutiny” (p.5125). It has also been stated that many practitioners are resistant to evidence-based programmes on the basis of their perception that such programmes are not suitable for their local context, too prescriptive and that they undermine their professional autonomy and judgement (Davis et al., 2012).

Even after successful pilots, where EBPs are shown to produce positive outcome, some effective programmes are discontinued and seldom last for more than a few years (Frydenburg et al., 2004; Harrington and Clark, 1998; Weare and Nind, 2011). Lendrum and Humphrey (2012) explain that “in the English context, for example, school staff have been expected in recent years to implement ever-increasing numbers of new interventions. This has resulted in ‘initiative overload’, cynicism about the longevity and sustainability of interventions and a reluctance to invest limited time, resources and personal effort into new initiatives that are likely to be short-lived and quickly replaced” (Lendrum and Humphrey, 2012).

Another barrier to universal interventions in particular might be the perceived overburdened curricula and political pressure to focus on classic academic subjects (Fridrici and Lohaus, 2009; Hahn et al., 2007). Fridrici (2009) explains “with an increasing societal and political pressure to realign on classical academic targets, stress prevention or mental health promotion efforts are sometimes even seen as “a loss of lessons” for classical subjects. In fact, regarding school effectiveness, academic performance has become the core outcome variable again” (Fridrici, 2009).

Although universal programmes such as PATHS and FRIENDS have demonstrated some market penetration in English schools, mental health provision tends to be developed at the local-level and targeted at children showing early signs, or who have already developed, emotional and behavioural problems. The Vostanis et al. (in press) survey found that much local innovation was described as flexible and adaptable to an individual child’s situation.

It is difficult to tell to what extent these innovations might draw on the principles of stress management as have been described in this chapter. Nevertheless, Head Teachers report that the help most likely to be offered to disruptive or unhappy children is ‘listening to

the child's problems and offering understanding and general support' and 'teaching them how to behave and think differently in situations they find difficult' (Vostanis et al., in press). This could suggest that there is an appetite for stress management training, even if only as a targeted prevention or early intervention service.

If universal stress management training is to be implemented more widely then concerted efforts are needed by service designers, researchers, funders, practitioners and policy-makers in order to design, test and implement effective approaches in schools.

Although it has been argued that "It is usually a waste of time and resources, and is potentially risky, to implement a programme that has no or shaky evidence" (Merrell and Gueldner, 2010 p.29), relying too heavily on evidence-based programmes might serve to stifle the creativity and innovation that happens in schools. The Vostanis et al. (in press) survey very clearly showed that programme design is by no means the sole preserve of academia. Perhaps efforts should be directed at equipping school staff with freely available service design tools and greater access to the research literature in an effort to inject greater chance that their innovations will be produce the desired outcomes?

Many staff involved in delivering mental health programmes have no specialist training despite the growing number of training initiatives to promote mental health literacy amongst school personnel (Vostanis et al., in press). Thus, teacher training could be revised to include the development of skills in delivering interventions, and to further promote stress and mental health literacy (Whitley et al., 2013; Zins, 2001).

It might also be possible to incentivise schools to address the emotional and behavioural needs of their students and to set targets. Elias et al. (2002) posits that "student success depends a great deal on what we call "the other side of the report card". Students who are actively engaged in class and come prepared, who cooperate with their peers, who resolve conflicts peacefully, who complete their work, who attend school often and on time, and who demonstrate initiative and leadership are more likely to succeed in school and ultimately in life" (Elias et al., 2002). This leads him to argue somewhat radically, "If these characteristics are so important, why do not newspapers rank schools in terms of the social and emotional aspects of education as well as test scores" (Elias et al., 2002).

Behaviour (and safety) of children is one of the areas on which schools are judged in Ofsted inspections and they are also required to demonstrate how they have conformed to relevant government policies such as the *Mental Health Strategy* (HM Government, 2011) but perhaps Elias' more radical approach would complement these efforts.

The potential for school-based stressors to provide a context to teach children transferable skills for adapting positively to the inevitable stressors they will face throughout childhood and later in life has already been discussed at length. Many schools in the UK currently provide transition programmes to help children transfer to secondary school as smoothly as possible (Galton, 2000; Galton et al., 2000). Perhaps a national stress management training programme could be developed that focused on transition as an experiential learning context. Furthermore, children in secondary schools currently attend Personal Social and Health Education (PSHE) lessons, perhaps a stress management intervention could be integrated into the PSHE curriculum (Coalition, 2012).

The focus of this chapter has largely been on programmes, this is reflected in the literature more broadly where the emphasis on programmes is largely a consequence of the relative ease with which programmes can be subjected to experimental evaluation. Nevertheless, there are a number of challenges currently inhibiting the widespread scale-up of evidence-based programmes and increasingly there are calls for designers and researchers to consider developing and testing *practices* and *processes* as an alternative to programmes (Little and Sodha, 2013).

At this point it would be remiss to overlook the Social Emotional Aspects of Learning programme (SEAL) (Vostanis et al., in press). Developed under the direction of the previous Labour government, SEAL is a school-based programme designed to promote children's self-awareness, emotional intelligence, motivation, social skills and empathy. Although guidance documents provide a framework for the implementation of SEAL, it is not a manualised programme and as Jones (2011) notes "schools pursue SEAL in highly varied ways" (p.736). Quasi-experimental evaluations of SEAL suggest that it is largely ineffective (Wrigglesworth et al., 2012). Despite this evidence, the programme is pursued in 90 per cent of primary schools, and 70 per cent of secondary schools (Jones et al., 2011). Although of course no mechanism was available to regulate how well it was

implemented, what SEAL does illustrate is that it is possible to scale a universal prevention programme in primary and secondary schools. Arguably one of the drivers of SEAL's success has been the relative flexibility of the approach when compared to traditional evidence-based programmes.

Programmes are discrete, organised packages of intervention, often described in a manual that explains the intended target group, theory of change, core components of the intervention and information on the financial and human resources required to deliver it. *Practices* on the other hand refer to the activities of practitioners; the things that teachers (or social workers, psychologists and other professionals) do in their everyday work to improve the well-being of children (Little and Sodha, 2013). There is a general movement towards breaking down programmes into discrete elements, techniques or 'practices', aimed at changing people's behaviour, sometimes referred to in the literature as 'evidence-based kernels' (Embry and Bigland, 2008). These reflect the core elements that lie at the heart of effective programmes. In relation to stress management, it might be possible to train practitioners and teachers to apply CBT as a flexible *practice* in their everyday interactions with children.

*Processes* operate in service systems and can include the methods through which children are expected to access services, and how their needs are assessed (Little and Sodha, 2013). Processes, like well-tested screening tools can indirectly lead to better outcomes (Albers and Glover, 2007; Tymms and Merrell, 2006). The results of this study suggest that it might be possible to identify children who are likely to struggle in response to impending stressors on the basis of their interpretation of the meaning and significance of those stressors. A screening measure could be developed that identifies those most likely at risk in upcoming stressful contexts - based on the way that they are appraising and planning to cope with the impending event. There is, however, no point in identifying children with problems (or who are at risk) if the consequence is access to ineffective treatments - or to nothing at all (Albers et al., 2007; Levitt et al., 2007).

## 9.11 CONCLUSION

The prevalence, burden and under-treatment of emotional and behavioural problems and the pervasiveness of stress, strongly suggest that stress management should be a public health priority (Nehmy, 2010; World Health Organisation, 2004). Research also suggests that sheltering children from stress is likely to cause more harm than good (Seery, et al., 2010). Instead it has been argued that efforts should be focused on training children to manage stress in an adaptive way rather than avoid it altogether (Rutter and Rutter, 1993; Rutter, 2012). There is a dearth of evidence for such approaches in the literature on what works to improve children's emotions and behaviour (Adi et al., 2007; Boekaerts, 1996; Kraag et al., 2006; Lister-Sharp et al., 1999; Weare and Nind, 2011).

As outlined in this chapter, a universal stress management training programme could be designed that utilises routine stressors as context for teaching children how to develop a positive style of appraising stressors. With eight million children and young people attending primary and secondary schools in the UK, it has been argued that schools are the ideal providers of such a service (Adi et al., 2007). In the meantime, there are a number of existing universal, school-based and evidence-based programmes that might serve a similar purpose, if the barriers to their implementation at scale within the school system can be overcome.

Finally, a note of cautious optimism seems appropriate to conclude the thesis:

*“the findings discussed here should not be interpreted as minimizing the possible negative consequences of adversity or as advocating intentional encouragement of adversity. Bad things are still bad things. This work does, however, suggest that experiencing adversity may have an upside—a silver lining—in that it may help foster resilience” (Seery, 2011, p.394).*



## APPENDIX I: Exams and transition to secondary school

Examinations are one of the most frequently used paradigms in experimental, laboratory-based, stress research (Bosch, de Geus et al. 2004, Gunnar, Talge et al. 2009). Many of these studies have shown that performance-based tasks (where there is an opportunity for others to negatively judge that performance) are associated with higher levels of cortisol secretion and physical symptoms of anxiety (for a review see Dickerson and Kemeny 2004). In terms of the impact of examinations, such as those under study in this PhD, on children's emotional and behavioural outcomes researchers have largely focused on the construct of test anxiety. Test anxiety refers to the experience of anxious symptomology connected to performance assessment in an academic setting. Test anxious children may display cognitive, affective and behavioural symptoms, including terror, dizziness, tension, trembling, sweating, clammy hands, voice tremor, poor concentration and intrusive negative thoughts. It has been estimated that about 20% of school children suffer from test anxiety (Wilson and Rotter 1986, Zeidner, Klingman et al. 1988). In terms of the factors that distinguish between individuals who display test anxiety and those who don't, the evidence is somewhat limited and there are few studies of the role of stress response processes such as appraisal, coping and cortisol.

Many researchers describe transition as a time of increased stress and higher rates of psychological symptoms (Grant, Compas et al. 2004). The ORACLE (Observational Research and Classroom Learning Evaluation) transfer study conducted in the UK between 1975-1980 is one of the most comprehensive and well-known studies of the effects of primary secondary transfer to have ever been conducted. It involved observations of teachers and pupils as well as tests of the attitudes and anxiety levels of pupils. It revealed that anxiety was high in the June prior to transfer, declined in the November following transfer and further declined by the following June. This pattern has been observed in many other studies of transfer, including Measer and Woods (1984) who report that the last term in feeder (primary/middle) school is characterised by "high anxiety tinged with excitement and optimistic expectation". There is also evidence about a general decline in achievement and self-esteem during the transition. This overall trend of recovery has led to the adoption of the term "dip" or "hiatus" to describe the transition's impact on outcomes. This decline occurs irrespective of the exact age of transition - as shown in international research on the subject (Galton, Morrison et al. 2000).

There are of course individual differences and there have been studies of the factors that might explain this variation (Seiffge-Krenke 2000). Nisbet and Entwistle (1969) in one of the earliest large-scale studies of school transfer, found that the youngest and least mature students are at the greatest risk from transfer experience. Later research, mostly from the UK and US indicates that low levels of confidence, a non-academic disposition and poor socio-economic background are also important. There has very little research however that looks at how children *appraise* the transition (Sirsch 2003).

Exams and transition are both routine stressors; many children experience them and do so at the same time as their peers. It is clear from the limited empirical research on the effects of these stressors, that they pose some risk to children's emotions and behaviour. What is not clear, is whether stress responses processes such as cognitive appraisal, coping and cortisol can explain variation in children's emotional and behavioural outcomes following exposure to exams and transition.

## **APPENDIX II: School information sheet**

This brief paper outlines what the study is about, what it aims to achieve and what is involved for those taking part.

### **What is the study about and why is it taking place?**

The South West Experience of School Stress (SWESS) study is interested in how certain elements of a child's school life are stressful, and in turn how such stress may affect them.

In particular the study is concerned with the stress resulting from key stage two examination in primary school and the transition from primary to secondary school. It is often said that these are stressful times for children, but there is very little strong evidence about just how stressful this is, for how many children, and what impact this stress has upon them. We want to say with certainty just how stressful these experiences actually are (if at all) and what impact they may have so that better decisions can be made about how children are assessed and make the transition between schools.

### **How will the study answer these questions?**

In order to answer these questions with accuracy we need a robust, bold and innovative method. It will therefore follow a group of about 200 children from year six of primary school through to year seven of secondary school.

- (4) In the first half of year six children will be given a number of short questionnaires asking them about how stressed they feel in general, how happy they are, what their behaviour is like and how much they feel connected to school.
- (5) They will then be asked a similar (but shorter) set of questions during the period of the key stage two exams at the end of the year when they might be feeling stressed.
- (6) Finally they will then be asked another similar set of questions at the beginning of the year at the point of transition to their new secondary school.

All of these questionnaires will be hosted on computers via the internet in school. They will be engaging for children and quick to complete.

But what makes this study stand out from many others is that in addition to asking children how they *feel*, we will also be measuring how physically stressed they are at each of the above time-points. This will be done by assessing how much of the stress hormone 'cortisol' they are releasing in their bodies. We will therefore get a great picture of how stressed children say they are, but also how physically stressed their bodies are.

This hormone, cortisol, is easy to measure. It does not involve any invasive procedures, visits to laboratories or health risks. It is simply collected by children providing saliva samples at home.

### **What is involved for schools taking part?**

The level of involvement for all taking part is kept to a minimum. It is acknowledged that schools are busy places with many time and resource constraints.

- (7) Primary schools are asked to get all children in year six to fill out the online questionnaire at two points in year six: once in January and once in May. At each point this should take no longer than half an hour.
- (8) Secondary schools are asked to get all children in year seven (many of the same children assessed in primary school) to complete the online questionnaire once at the beginning of the school year.

Schools will also be asked to send out parental consent letters to all students involved (but all postage will be paid for).

### **What do schools get in return?**

In return, all schools that take part will be provided with a report that documents the nature and distribution of mental health problems (behaviour, emotions, hyperactivity, peer problems etc.) in that school. Local authorities as a whole typically pay in the region of £30,000 for such data, but the research team will provide this for free. Results of the study will also be fed back to schools.

### **What is involved for children and families?**

We are asking all children in year six through to year seven to complete the three online questionnaires mentioned above. We are also asking them to collect saliva samples at each time-point (January, May and September). This involves simply drooling into a plastic tube and sending samples to the research team. At each time-point children, supervised by their parents, will be asked to collect samples when they wake up, 30 minutes later, and then again in the afternoon/early evening. This needs to be done for three consecutive days at each time-point. All materials will be provided and postage costs paid for. Detailed yet easy to follow instructions will be provided, along with voluntary question and answer workshops.

### **What do children and families get in return?**

All children and families taking part will be entered into a draw to win a cash prize of between £25 and £250. Overall findings will be fed back to all taking part. For further information contact either:

**Sarah Blower:** tel no: 01803 763414 / e-mail: [sblower@dartington-i.org](mailto:sblower@dartington-i.org)

**Tim Hobbs:** tel no: 01803 763416 / e-mail: [thobbs@dartington.org.uk](mailto:thobbs@dartington.org.uk)

## **APPENDIX III: Parent information sheet**

### **South West Experience of School Study (SWESS) Parent/Guardian Information Sheet**

Your child is being invited to take part in a research study that is being conducted by researchers at the Dartington Social Research Unit (DSRU) in partnership with the Totnes Learning Community. Before you agree to your child taking part, it is important for you to understand why the research is being done and what it will involve (particularly as you will be required to assist with some elements of the study at home). Please take the time to read the following information carefully and discuss it with others if you wish.

#### ***What is the purpose of the study?***

The study aims to look at the impact of key stage testing (SATs) and the transition to secondary school on children's stress levels, behaviour and engagement with school. We hope to ask all children in year six of primary school how they feel about key stage two exams (SATs) and how stressed this makes them, and then also follow those children that go on to KEVICCs and ask them about the transition to secondary school.

We are specifically interested in two issues: i) the physical stress responses of children before and during these potentially stressful periods; and ii) how these reactions might be linked to children's behaviour, school engagement and academic performance.

#### ***Why has my child been chosen?***

All year six children in a selection of local primary schools (within the Totnes Learning Community) are being asked to participate. Even if your child is not going to KEVICCs we still want to know how they feel about their upcoming exams.

#### ***Are there any incentives for taking part?***

Upon completion of the final questionnaire your child will be entered into cash prize draw. The winners will be selected at random for one £250 sum and ten £25 sums.

#### ***Does my child have to take part?***

It is up to you to decide whether or not to take part with your child. If you do decide to take part, you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will in no way influence your child's schooling.

If you agree to take part, your child will also be asked to complete some questionnaires at school. Again, your child will have opportunity to choose whether or not they complete these.

#### ***What will taking part in the study involve?***

This is a 9-month study starting in March and it will be completed by the end of 2008. During this period, we will ask you to:

a) Supervise the collection of samples of your child's saliva on three separate occasions in 2008: March, May (during the KS2 testing period) and if your child is will be going to KEVICC's, then again in September (during the period of transition to secondary school).

### **Why are we collecting saliva from your children?**

This is to assess how physically stressed your child is. There is a hormone in saliva called 'cortisol' that allows us to assess this. The procedure used to collect saliva samples has been used in many other studies with children of this age and it is very simple and safe. Most children actually enjoy it! We adhere to strict ethical and scientific protocols surrounding the use of saliva.

Samples need to be collected when the child wakes up, 30 minutes after waking, and in the afternoon when the child gets home from school (no samples will be collected at school). This is done over 3 days at each time point. All your child will need to do is place a cotton swab in their mouths until saturated with saliva and then place in a small plastic tube. You then seal and place the plastic tube provided in your freezer. At each period over 2008 (March, May and September), once all samples are taken, one of the researchers will contact you and come to pick samples up direct from you (we will call to arrange a convenient time for yourselves, be it early morning, daytime, evening or weekend). Samples will then securely be delivered to the laboratory by special courier. We will provide you with further details nearer the time about all of this if you agree to take part.

b) Keep a small diary noting what time your child goes to bed and wakes up, any medications your child is taking, and precise times samples are taken (as this may affect the results we get).

### **During this period we will ask your child to:**

a) Provide saliva samples at three separate time points (as described above).

b) Complete an online questionnaire in school at several times during the year (coinciding with saliva sample collection during March and May (and September if your child goes to KEVICC's). These questionnaires record information about their feelings towards tests and the transition, in addition to questions about their general well-being, behaviour, emotions, relationships with others and social support. Each will take about 30 minutes to complete in school. Children will have the opportunity to skip any questions they do not wish to answer if they wish.

You may request to see copies of these questionnaires directly from us if required (on the contact details below). Again, it is important to note that no children will be individually identified from these questionnaires. No individual child scores will be made available to

schools and therefore no specific decisions about any aspect of your child's schooling will be made on the back of these questionnaires.

***Will my taking part in this study be kept confidential and what will happen to saliva samples?***

Any information you provide will be kept strictly confidential. No one, other than the researchers involved in the project, will see or have access to the questionnaires and your child's personal details. Your child's saliva samples will be assigned a numerical code before being analysed for cortisol only and will be identified only by this number. No individual children will be identifiable from the saliva samples. Although it is possible to extract DNA from saliva, this will not be done by the research team, laboratory or anyone else. The samples will be safely destroyed immediately following the cortisol analysis.

***What will happen to the results of the research?***

Once the study has been completed, you will receive an overall summary of the main results. The schools involved will also receive a report and it is hoped that the findings will be used to inform planning and service provision to better suit the needs of children experiencing examinations and transition, both locally and elsewhere.

The findings of this study will also make a valuable contribution towards our currently limited understanding of exactly how stressful testing and transition are for children and the potential impact of these experiences on children's outcomes. As a result the findings will also be presented at national and international conferences and published in academic journals You and your child will not be identified in any reports or publications of the research.

***Who is conducting this research?***

The project is being carried out by Tim Hobbs and Sarah Blower, both are researchers at the Dartington Social Research Unit.

***How do I find out more about the study and how do I take part?***

If you agree for your child to take part in this study then please complete the consent form attached to this letter and return to the school. As soon as your consent form is received, we will contact you to give you further details about the study and respond to any of your questions if you agree to take part. Alternatively, please do feel free to contact us with any questions or concerns you may have. We are more than happy to answer any questions:

Tim Hobbs: tel no: 01803 763416 / e-mail: [SWESS@dartington.org.uk](mailto:SWESS@dartington.org.uk)

Sarah Blower: tel no: 01803 763414 / e-mail: [SWESS@dartington.org.uk](mailto:SWESS@dartington.org.uk)

**SWESS Study Team  
Dartington Social Research Unit  
Lower Hood Barn  
TQ9 6AB**

***Thank you for taking the time to read this information.***

## APPENDIX IV: Parent consent form

### CONSENT FORM:

Please return to the school by \_\_\_\_\_

The South West Experience of School Stress (SWESS)

**Name of researchers:**

Tim Hobbs & Sarah Blower

Dartington Social Research Unit

Lower Hood Barn

Dartington

TQ9 6AB

**Please circle as appropriate**

**1.** I confirm that I have read and understand the information sheet about the study and have had the opportunity to ask questions.

Yes / No

**2.** I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

Yes / No

**3.** I give permission for my address and phone number to be used by the researchers to contact me for the needs of the study.

Yes/No

**4.** I give permission for my child's school to let the research team know whether my child is going to KEVICC's or not (when they know)

Yes / No

**5.** I agree for my child to take part in this study

Yes / No

Name of child: \_\_\_\_\_

Name of school: \_\_\_\_\_

Name of Parent/Guardian: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Address (so we can send you further materials in future):

Contact telephone number:



## APPENDIX V: Parent instructions for saliva sample collection

Dear Parent,

Some time ago you received a letter from your child's school asking if you would be prepared for your year six child to take part in a study interested in how stressful children find school, exams and transitions. You kindly agreed for your child to take part. Your child will have already completed a questionnaire at school (or will do shortly). The next stage is to collect some saliva samples!

You may remember that the reason we want to collect saliva samples is so that we can measure the volume of a hormone called 'cortisol'. This hormone gives an indication of how stressed (or not) your child is. The procedure is very **easy** and very **safe**. However, it is very important that samples are collected at the right times, so please carefully read the instructions enclosed.

Basically you need to collect three saliva samples from your child per day (when they wake up, 30 minutes later, and then again at about 8 p.m. in the evening). You need to do this for three consecutive school days in a row. Everything you need to know is enclosed. Once finished either Tim or Sarah (the main researchers) will then come and pick samples up at a time convenient to you. Only levels of saliva will be determined. No other information will be extracted (including DNA). All samples will be destroyed immediately following analysis.

You may also remember that as you agreed to take part, and assuming you collect all samples correctly (now, in May, and again in September *if* your child is going to KEV ICCs) you have at least a one-in-ten chance of winning either a **£25** or **£250 cash prize!** You will also be helping us enormously and will be contributing to our understanding of child stress.

If you have any questions at all please do not hesitate to get in contact with either Tim Hobbs or Sarah Blower, the two researchers running this study. We will be in touch about the May and September saliva collections nearer the time. However, you can catch us anytime on.....

**telephone:** 01803 763414

**email:** [swess@dartington.org.uk](mailto:swess@dartington.org.uk)

Again, we would just like to thank you once more for taking part in this study.

Kind Regards

Tim Hobbs and Sarah Blower

SWESS study team; Dartington Social Research Unit

## **General information**

Enclosed are three bags, each containing three plastic test tube-like containers. Under your supervision at home, your child needs to give three saliva samples per day for a period of three consecutive days. Full instructions about exactly how to collect and store the samples are provided shortly, but first...

### **What days should I collect samples on?**

These three days can be any **three consecutive school days** over the next two weeks. But note, they must be school days, and the three days must all be in a row. This means you can either do:

Monday - Wednesday

Tuesday - Thursday

Wednesday - Friday.

### **What times do I collect samples each day?**

The timing of sample collection is very important. You must do everything you can to make sure samples are collected at the right times (even though we appreciate mornings can be tricky!).

For each day there are three colour-coded test tubes. The coloured lids correspond the correct sample collection times.

**Red:** for samples collected at child's **awakening**

**Yellow:** for samples collected **30 minutes after awakening**

**Green:** for samples collected at **8 o'clock in the evening**

It is very important that samples are collected as close to these times as possible.

The red awakening sample must be collected as soon as your child wakes up, whilst she/he is still in bed. You must also make sure your child does not eat or brush their teeth within an hour before sample collection (full details within the step-by-step instructions).

### **How do I store samples once collected?**

Once you have collected each sample, all you need to do is put the test-tube in the plastic freezer bags enclosed and put in the freezer immediately. They are totally safe to store this way. We will be in touch to arrange pick-up of samples shortly.

### **What else must I do?**

In addition to collecting and storing the samples, you also need to fill in the short diaries enclosed each day. These give information about exact times of sample collection, awaking and sleeping times and any medication your child is taking. It is important for us to know this as they may affect the results.

### Step-by-step instructions

#### **Step 1**

Hold the tube at the rim and remove the stopper by gently pulling, (the inner plastic tube remains in the test-tube).

#### **Step 2**

Remove the cotton swab from the tube by tipping into the stopper

#### **Step 3**

Place the swab in your child's mouth under the tongue or between the cheek and lower teeth. He/she may move it around where they have the most saliva. The cotton should remain in the mouth until the child feels that she/he can no longer avoid swallowing the saliva produced. This usually takes about two minutes but may take longer. ***Please be sure that the cotton is thoroughly saturated before removing it from your child's mouth.*** Basically the swab is just like a sponge and you want it to absorb as much liquid as possible. Therefore, your child should try not to bite down on it or suck on it before it is removed from their mouth.

#### **Step 4**

***When the cotton swab is thoroughly saturated***, return the swab to the tube and close the tube ***tightly*** with the stopper.

#### **Step 5**

Next, place the tube in the correct freezer bag provided and put it in the freezer immediately - please try to freeze as soon as possible.

#### **Step 6**

Please complete the diaries each day indicating the exact ***time and date the sample was taken*** and the ***questions regarding medication and sleep***

### Important Do's and Don'ts

#### **Do's....**

Collect samples at the correct time (or as close to as possible) using the right colour-coded tubes

Make sure you put samples in the freezer as soon as possible after collection

Each day, make sure you fill out the time/medication sheets enclosed

#### **Don'ts.....**

Make sure your child does not eat or brush their teeth at least an hour before collecting samples

Make sure your child does not have anything other than water to drink directly before collecting samples.

Don't use anything to stimulate saliva flow (such as sweets, chewing gum etc).

## APPENDIX VI: Cortisol diary

### DAY 1 Diary

#### Timetable for Saliva Samples

In the table below, please report the date and time that your child's samples were collected on DAY 1. *The exact time of collection is very important to us, even if you could not get the sample at the exact time specified.* If you have not collected a sample, please leave the box blank.

Date: \_\_\_\_\_

DAY 1	Exact time the sample was collected
SAMPLE NO. 1 : Awakening (RED LID)	
SAMPLE NO. 2: 30 minutes after awakening (YELLOW LID)	
SAMPLE NO. 3: 8 o'clock in the evening (GREEN LID)	

#### Questions about Medication and Sleep

Did you or your child encounter any problems when collecting the samples (for example, collected a sample in the wrong container, have breakfast or brush teeth before collecting a sample)?

.....  
.....

#### Did your child take any medications today?

YES      NO

\*If you have circled YES please give details. Over the counter medications and alternative remedies such as herbal supplements should also be included.

Medication Name

Dosage

.....

.....  
 .....  
 .....

Finally, is there anything that may be making your child feel particularly stressed today (please describe).....

What time did your child go to bed (approximately)?.....

What time did your child wake up?.....

## DAY 2 Diary

### Timetable for Saliva Samples

In the table below, please report the date and time that your child's samples were collected on DAY 2. *The exact time of collection is very important to us, even if you could not get the sample at the exact time specified.* If you have not collected a sample, please leave the box blank.

Date: \_\_\_\_\_

DAY 2	Exact time the sample was collected
SAMPLE NO. 1 : Awakening (RED LID)	
SAMPLE NO. 2: 30 minutes after awakening (YELLOW LID)	
SAMPLE NO. 3: 8 o'clock in the evening (GREEN LID)	

### Questions about Medication and Sleep

Did you or your child encounter any problems when collecting the samples (for example, collected a sample in the wrong container, have breakfast or brush teeth before collecting a sample)?

.....  
 .....

**Did your child take any medications today?**

YES      NO

\*If you have circled YES please give details. Over the counter medications and alternative remedies such as herbal supplements should also be included.

**Medication Name**

**Dosage**

.....

.....

.....

.....

Finally, is there anything that may be making your child feel particularly stressed today (please describe).....

What time did your child go to bed (approximately?).....

What time did your child wake up?.....

**DAY 3 Diary**

**Timetable for Saliva Samples**

In the table below, please report the date and time that your child's samples were collected on DAY 3. *The exact time of collection is very important to us, even if you could not get the sample at the exact time specified.* If you have not collected a sample, please leave the box blank.

Date: \_\_\_\_\_

DAY 3	Exact time the sample was collected
SAMPLE NO. 1 : Awakening (RED LID)	

<b>SAMPLE NO. 2: 30 minutes after awakening (YELLOW LID)</b>	
<b>SAMPLE NO. 3: 8 o'clock in the evening (GREEN LID)</b>	

### Questions about Medication and Sleep

Did you or your child encounter any problems when collecting the samples (for example, collected a sample in the wrong container, have breakfast or brush teeth before collecting a sample)?

.....  
 .....

### Did your child take any medications today?

YES      NO

\*If you have circled YES please give details. Over the counter medications and alternative remedies such as herbal supplements should also be included.

**Medication Name**

**Dosage**

.....  
 .....  
 .....  
 .....

Finally, is there anything that may be making your child feel particularly stressed today (please describe).....

What time did your child go to bed (approximately)?.....

What time did your child wake up?.....



## APPENDIX VII: Descriptive statistics relating to cognitive appraisal

(as measured by the *Stress Appraisal Measure for Adolescents*)

**TABLE 23: Descriptive statistics relating to the SAMA**

	Time 1 (baseline)			Time 2 (exams)			Time 3 (transition)		
	Threat	Challenge	Resources	Threat	Challenge	Resources	Threat	Challenge	Resources
<b>Mean</b>	1.22	1.95	2.44	1.13	2.25	2.61	1.27	2.88	3.26
<b>Median</b>	1.14	2.00	2.67	1.14	2.25	3.00	1.36		3.67
<b>95% CI range</b>	1.06 - 1.38	1.70 - 2.19	2.19 - 2.68	0.97 - 1.29	2.01 - 2.49	2.36 - 2.85	1.06 - 1.48	2.62 - 3.14	3.11 - 3.54
<b>SD</b>	0.61	0.97	0.95	0.63	0.94	0.97	1.36	0.84	0.70
<b>Variance</b>	0.37	0.93	0.90	0.40	0.88	0.95	0.46	0.71	0.48
<b>Skewness</b>	0.56	0.31	-0.33	0.51	-0.24	-0.40	0.20	-1.00	-1.76
<b>Kurtosis</b>	0.46	-1.04	-0.35	-0.55	-0.46	-0.76	-0.34	0.80	4.00
<b>Scale alpha</b>	0.70	0.87	0.73	0.71	0.88	0.81	0.53	0.85	0.81

### Normality (Shapiro-Wilk)

Threat:

Time1: S-W = .97, df = 58, p = .24 (normal)

Time2: S-W = .95, df = 60, p = .02 (not 'normal')

Time3: S-W = .97, df = 42, p = .28 (normal)

Challenge:

Time1: S-W = .94, df = 63, p = .006 (not 'normal')

Time2: S-W = .98, df = 62, p = .27 (normal)

Time3: S-W = .92, df = 43, p = .005 (not 'normal')

Resources:

Time1: S-W = .97, df = 62, p = .16 (normal)

Time2: S-W = .95, df = 63, p = .009 (not 'normal')

Time3: S-W = .81, df = 44, p = .000 (not 'normal')

**APPENDIX VIII: Descriptive statistics relating to coping**  
**(as measured by the *Coping Strategies for Children and Youth*)**

**TABLE 24: Descriptive statistics relating to the CSCY**

	Time 1 (Baseline)				(Time 2 (Exams))				Time 3 (Transition)			
	ass	pro	cog	beh	ass	pro	cog	beh	ass	pro	cog	beh
<b>Mean</b>	1.34	1.15	1.06	0.93	1.20	1.21	1.06	0.44	1.73	1.12	0.60	0.14
<b>Median</b>	1.25	1.00	0.82	0.83	1.25	1.13	1.09	0.33	1.75	1.25	0.45	0.00
<b>95% CI range</b>	1.17 - 1.52	1.03 - 1.27	0.89 - 1.22	0.79 - 1.07	1.08 - 1.31	1.05 - 1.38	0.91 - 1.21	0.32 - 0.57	1.52 - 1.96	0.85 - 1.39	0.43 - 0.77	0.06 - 0.22
<b>SD</b>	0.69	0.47	0.63	0.54	0.45	0.64	0.60	0.49	0.71	0.83	0.54	0.28
<b>Variance</b>	0.48	0.22	0.40	0.30	0.21	0.42	0.36	0.25	0.51	0.69	0.29	0.08
<b>Skewness</b>	0.08	0.70	0.93	0.49	0.35	0.42	0.60	1.42	-0.58	0.28	1.22	2.33
<b>Kurtosis</b>	-0.56	0.08	0.71	-0.25	0.41	-0.07	0.12	1.45	0.32	-0.83	1.46	4.78
<b>Scale alpha</b>	.791	.744	.895	.630	.111	.845	.828	.715	.743	.914	.864	.725

**Normality (Shapiro-Wilk)**

Assistance seeking:

Time1: S-W = .98, df = 64, p = .21 (normal)

Time2: S-W = .96, df = 63, p = .06 (not 'normal')

Time3: S-W = .95, df = 44, p = .06 (normal)

Cognitive-behavioural problem solving:

Time1: S-W = .94, df = 62, p = .007 (not 'normal')

Time2: S-W = .98, df = 61, p = .33 (normal)

Time3: S-W = .94, df = 39, p = .05 (not 'normal')

Cognitive avoidance:

Time1: S-W = .93, df = 59, p = .001 (not 'normal')

Time2: S-W = .96, df = 62, p = .067 (normal)

Time3: S-W = .89, df = 41, p = .001 (not 'normal')

Behavioural avoidance:

Time1: S-W = .96, df = 61, p = .04 (not 'normal')

Time2: S-W = .81, df = 63, p = .000 (not 'normal')

Time3: S-W = .57, df = 44, p = .000 (not 'normal')

## APPENDIX IX: Descriptive statistics relating to emotions and behaviour

(as measured by the *Strengths and Difficulties Questionnaire*)

**TABLE 25: Descriptive statistics relating to the SDQ**

	Time 1 (Baseline)			Time 2 (Exams)			Time 3 (Transition)			Time 4 (Follow-up)		
	Emo	Con	Total diffs	Emo	Con	Total diffs	Emo	Con	Total diffs	Emo	Con	Total diffs
<b>Mean</b>	3.45	2.53	13.05	2.842	2.84	15.02	3.43	2.48	12.61	2.96	1.74	10.16
<b>Median</b>	3.00	2.50	13.00	3.00	3.00	16.00	3.50	2.00	13.00	2.50	1.00	10.00
<b>95% CI range</b>	2.82 - 4.09	2.11 - 2.95	11.45 - 14.64	-2.24 - 3.44	-2.50 - 3.19	-13.90 - 16.13	-2.64 - 4.22	-1.92 - 3.03	-10.60 - 15.09	-2.34 - 3.59	-1.26 - 2.22	-8.47 - 11.86
<b>SD</b>	2.53	1.69	6.33	2.38	1.38	4.43	2.53	1.77	6.37	2.24	1.69	5.91
<b>Variance</b>	6.41	2.86	40.11	5.65	1.91	19.63	6.45	3.13	40.59	5.02	2.85	34.93
<b>Skewness</b>	0.50	0.25	0.04	0.76	0.66	-0.07	0.37	0.44	0.06	0.63	1.06	0.29
<b>Kurtosis</b>	-0.46	-0.95	-0.85	0.36	0.19	-0.97	-0.64	-0.83	-0.83	-0.55	0.97	-0.87
<b>Scale alpha</b>	0.77	0.48	0.83	0.77	0.08	0.64	0.82	0.29	0.85	0.67	0.62	0.82

### 2. Normality (Shapiro-Wilk)

#### Emotions

Time1: S-W = .94, df = 64, p = .003 (not 'normal')

Time2: S-W = .91, df = 63, p = .000 (not 'normal')

Time3: S-W = .94, df = 39, p = .040 (not 'normal')

Time4: S-W = .91, df = 52, p = .001 (not 'normal')

#### Conduct

Time1: S-W = .93, df = 64, p = .001 (not 'normal')

Time2: S-W = .91, df = 64, p = .000 (not 'normal')

Time3: S-W = .91, df = 42, p = .004 (not 'normal')

Time4: S-W = .87, df = 50, p = .000 (not 'normal')

#### Total difficulties

Time1: S-W = .97, df = 63, p = .164 (normal)

Time2: S-W = .97, df = 63, p = .130 (normal)

Time3: S-W = .96, df = 35, p = .172 (normal)

Time4: S-W = .96, df = 49, p = .119 (not 'normal')

## **APPENDIX X: Ethics statement**

### **1. Nature of Study**

This ethics statement relates to two separate studies that aim to investigate the impact of school-based normative stressors on child outcomes and the mechanisms underpinning that impact (should such a relationship be found). The first study will investigate the impact of stress resulting from key stage testing on children's school performance and engagement. The second study will investigate the impact of transition between schools on behavioural outcomes. As both studies will follow the same cohort of children over the two normative stressors using the same methodology it was therefore deemed appropriate to prepare one statement for both studies.

These studies will address the gaps in current literature, particularly the dearth of research on the impact of normative stressors (i.e. those experienced by most of us at some point in our lives) on children's development and wellbeing. We currently know very little about whether school-based challenges such as examinations and transition are physiologically and psychologically stressful for children (despite the large amount of anecdotal or equivocal evidence). We also know little about what impact these stressors may have on a range of outcomes and any mechanisms underpinning this. It is hoped that by addressing some of these issues the findings of both studies will be of use to other researchers, policy-makers and educational practitioners.

In essence, a cohort of roughly 200 children in the final year of primary school will be followed through the latter half of this primary year (and hence over the period of key stage two testing) through to the first year of secondary school (therefore the transition between schools). Children will be assessed at a number of points in time in relation to perceived stress, behavioural outcomes, academic performance and school engagement outcomes. This will be done using audio assisted computer interviewing (ACAPI) techniques over the internet. In addition, saliva samples will be taken at home in order to measure the hormone cortisol (a bio-maker of stress in the body). A number of potentially confounding variables will also be measured on the AAPI system.

### **2. Commissioner and funder of the study**

The work is funded by the Dartington Social Research Unit (DSRU) and forms the basis for two PhDs to be submitted to the University of Bath. External funding from the ESRC may also be applied for.

### **3. Scientific Scrutiny of the Study**

This proposal is under ethical and scientific scrutiny by a number of members of the Warren House Group ethics committee. Following this it will be submitted to the faculty of social sciences and policy at the University of Bath. If an external funding application is successful the study will also be scrutinised by the ESRC scientific and ethics committee.

#### **4. Consent to participation in the study**

The parents/carers of all children within participating schools will be sent a letter explaining the study and asking for parental consent. This letter will outline both the salivary and self-report measures involved in the study. The parental consent letter will clearly state that all information obtained will be totally confidential to the research team and no information about specific children will be passed on to schools. The only exception being if a particular child is experiencing pronounced difficulties that are viewed as potentially seriously damaging to the child's development. In such a case an appropriate contact at the school will be made (any decisions about further actions will be subject to the school's own ethical code of practice and legal requirements). A full protocol for identifying any such children will be developed and adhered to. It will be made clear to parents that the data will only be used for research purposes and that no child will be identifiable outside of the research team.

In addition, when children log-on to the internet to complete the ACAP questionnaires, they will also be presented with an informed consent page. They will be given information relating to the study and have the opportunity to consent (or not). This consent page will provide information comparable to that of the parental consent form, again in an easy to understand and non-threatening manner. If at any point parents or children do not consent to take part, no data will be collected (or if withdrawal of consent is expressed at any point after data collection, this data will be excluded from analysis and destroyed).

The purpose of obtaining salivary cortisol measures will be clearly explained in parental and child consent procedures. It will also be made clear that no DNA will be extracted and that samples will be anonymous to those staff analysing samples at the laboratory. It will also be made clear that once analysis of saliva is complete samples will be destroyed.

Participants taking part in the study that adhere to the salivary cortisol collection procedures will be entered into a draw to win a modest cash prize through a lucky draw as an incentive to take part (and also as a means of encouraging fidelity to data collection procedure). All participants and schools will also be sent an executive summary of the aggregate findings.

## **5. Collecting salivary cortisol**

The children participating in this study will be required to provide a number of saliva samples at home during the course of the year. From these saliva samples levels of the hormone cortisol will be assessed. A passive drool technique will be implemented and the saliva produced will be collected in small plastic tubes. These will be sent to a specialist laboratory for immuno-assay.

A comprehensive and simple to understand protocol will be provided to both parents and students, alongside a practical demonstration to ensure that participants collect the saliva appropriately and without difficulty. This protocol will also outline how to handle the saliva samples once collected; this is purely for the purposes of ensuring data integrity, not safety since saliva is not classified as a biohazard<sup>43</sup> and therefore poses a minimal risk to health for participants.

## **6. Confidentiality and data protection**

All individual child data will be entirely confidential outside of the research team. Each individual taking part will be asked to provide some unique identifiers (including name, date of birth and contact details) so that they can be followed through the course of this brief longitudinal study. However, unique identifiers will be separated from all data at the earliest opportunity and stored securely in a separate location. Individual data will be linked by a random identification number. Only DSRU staff will have access to the data.

Whilst it is not the intent of this study it is possible to extract DNA from saliva. For this reason, steps will be taken to ensure that the saliva, once collected and anonymised with the unique identifier, is stored securely at the University of Bath until it is securely shipped to the laboratory for analysis. Once levels of cortisol are successfully obtained from the saliva by immuno-assay the saliva will be destroyed by the laboratory.

No individual children will be identifiable by any outputs of this work. Children and parents will not be provided with details of individual scores and results, but will be presented with aggregated data from the whole sample and the overall findings of the study.

## **7. Dealing with damaging effects of the study on participants**

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<sup>43</sup> The Control of Substances Hazardous to Health Regulations 2002:  
<http://www.opsi.gov.uk/SI/si2002/20022677.htm#sch5>

Participation in this research requires students to complete questionnaires and collect saliva during two potentially stressful periods (key stage examination and transition to secondary school). Although it is extremely unlikely that taking part in this research could have a damaging effect upon the participants<sup>44</sup>, they can withdraw at any point and steps will be taken to minimise the disruption to children's daily schedule. The ACAPI data collection tool will be designed to be as brief as possible; completion should take no longer than 30 minutes.

When a particular child is identified by the research team as being likely to have significant impairment to development based upon one or more of the measures the aforementioned protocol will be followed. One possible source of information that may be provided to worried students, teachers or parents is the *Youth in Mind* website (developed by Robert Goodman's team). This provides details of books, websites and services that may support worried individuals.

## **8. Use of the study results**

Results will be used to form the basis of two PhD theses. It is hoped that the data collected on the students participating in the research will inform both the design of screening and identification instruments and preventative and early intervention services and discussions on educational policy with regards to transition and key stage testing.

## **9. Debriefing**

Participants, their parents and staff at the schools involved in the study will be invited to attend a debriefing event at which the results of the study will be disseminated.

## **10. Researchers on the study**

The main researchers on the study are:

- Sarah Blower BSc (hons)
- Tim Hobbs BSc (hons)

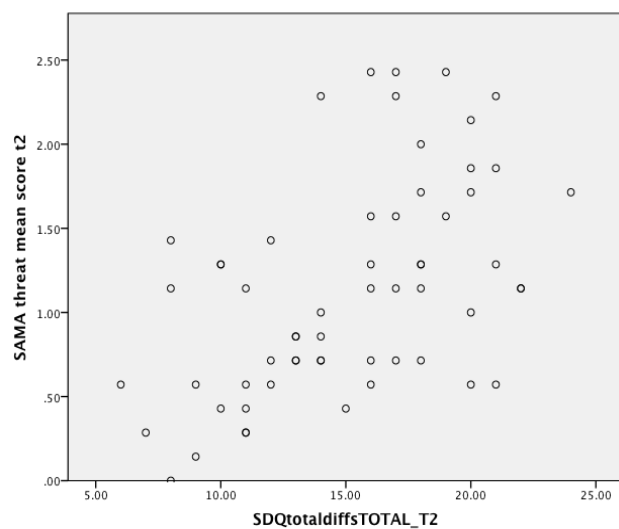
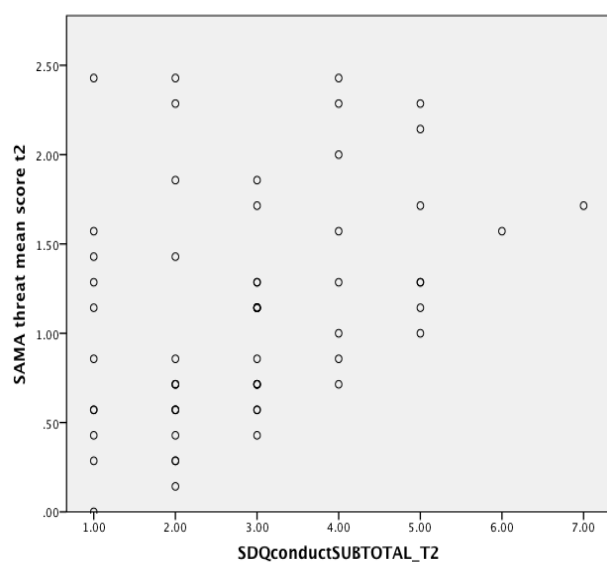
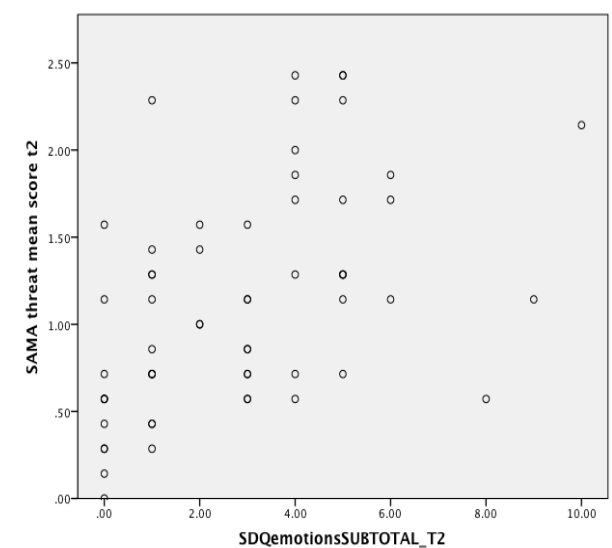
Both are supervised by Prof. Michael Little, Director of DSRU and visiting fellow at the University of Bath.

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<sup>44</sup> Straus (1981) and Newman et al (1997) observe that there is no empirical data supporting the suggestion that individuals experience psychological harm as a result of answering sensitive questions. In addition Hanrahan et al (2006) have noted that passive drool techniques for the collection of saliva have no harmful effects, physical or psychological, for participants.

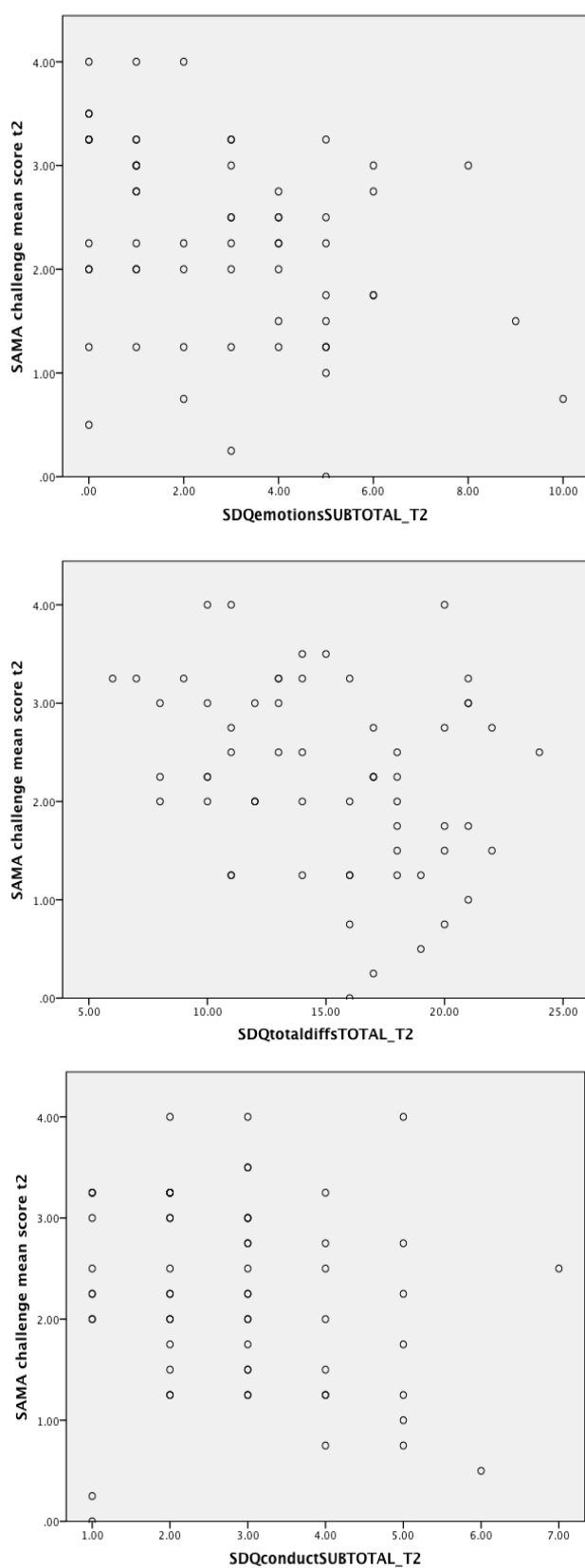
## APPENDIX XI: Scatter plots charting appraisal (SAMA) against mental health (SDQ)

FIGURE 22: Scatter plots charting SAMA threat subscale and all subscales of SDQ at T2

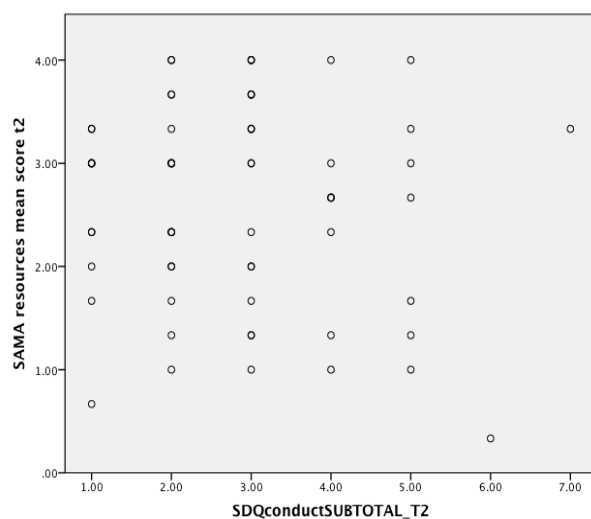
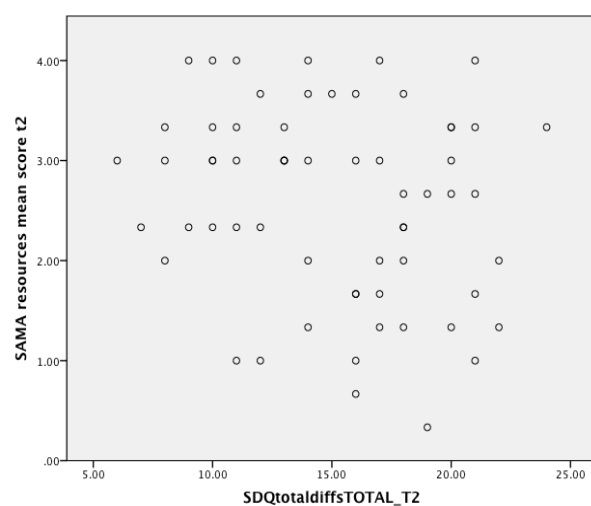
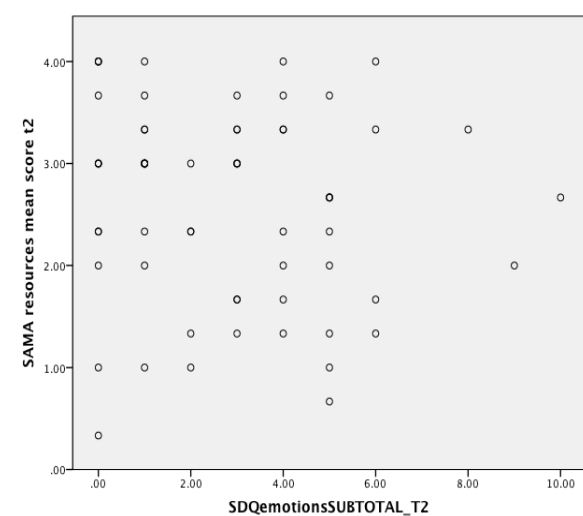




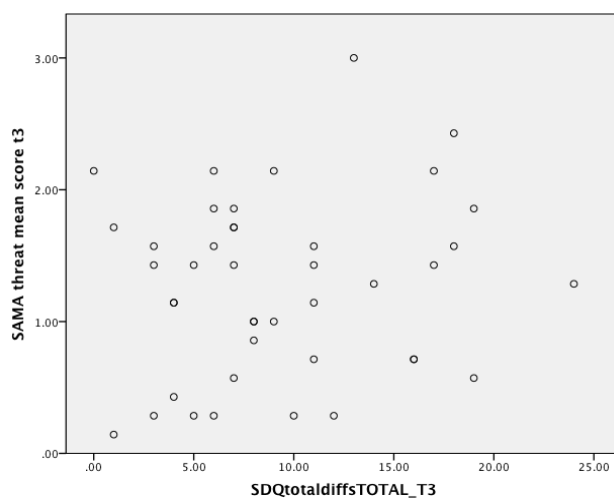
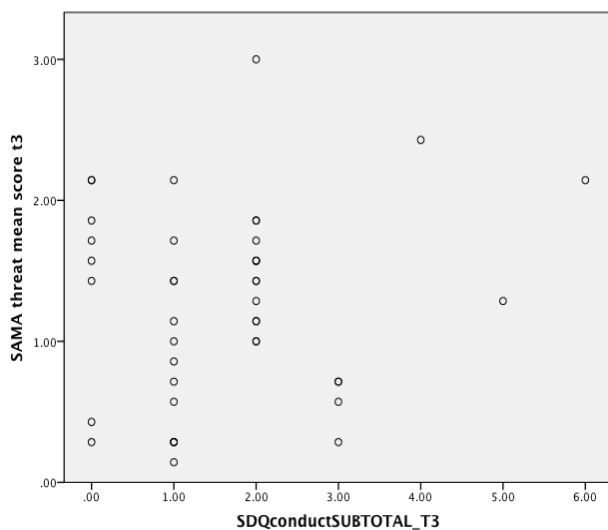
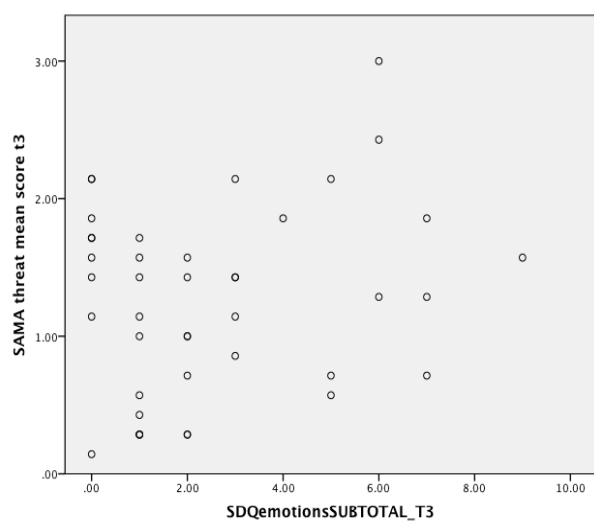
**FIGURE 23: Scatter plots charting SAMA challenge subscale and all subscales of SDQ at T2**



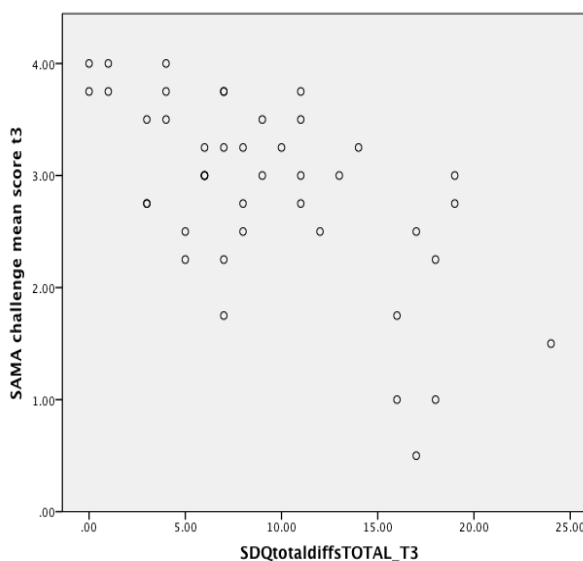
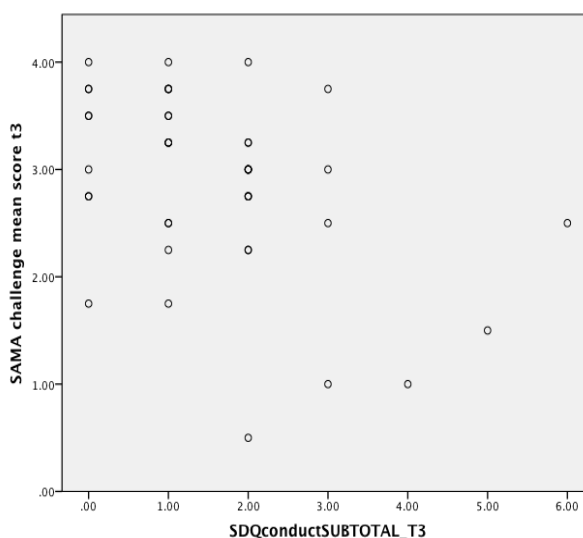
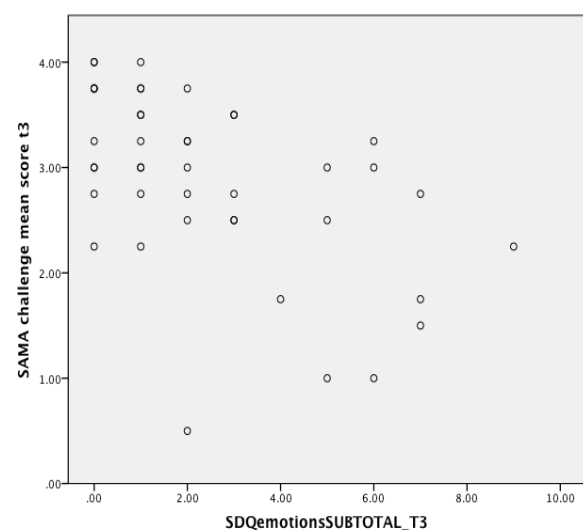
**FIGURE 24: Scatter plots charting SAMA resources to cope subscale and all subscales of SDQ at T2**



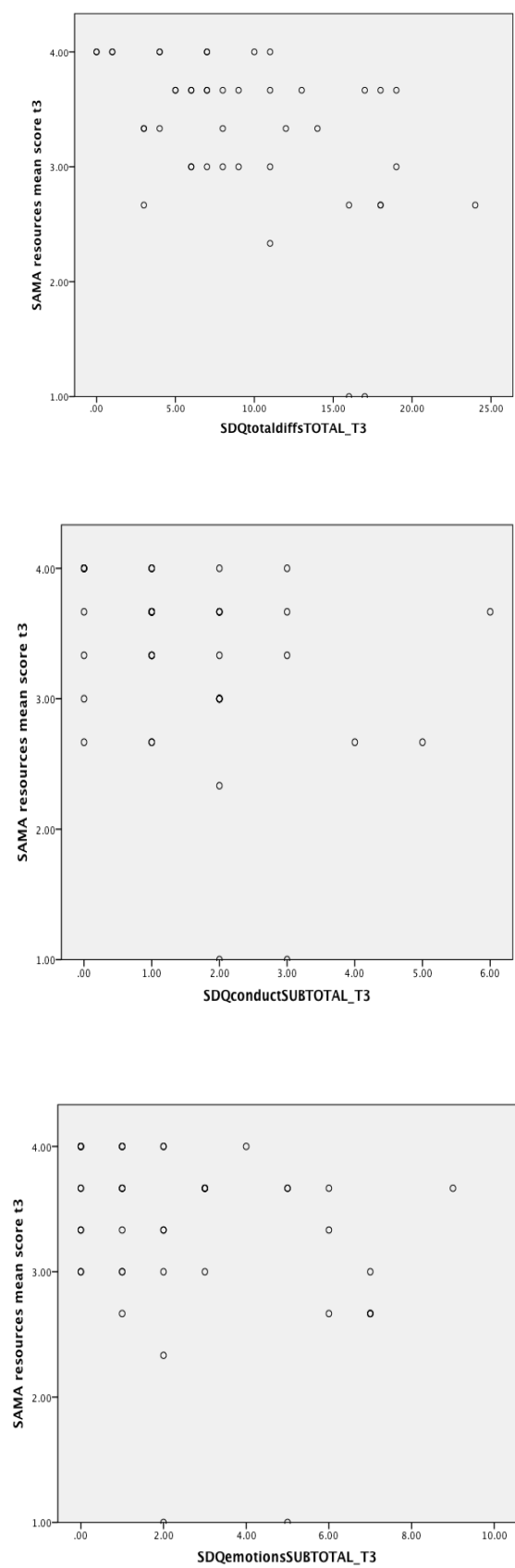
**FIGURE 25: Scatter plots charting SAMA threat subscale and all subscales of SDQ at T3**



**FIGURE 26: Scatter plots charting SAMA challenge subscale and all subscales of SDQ at T3**

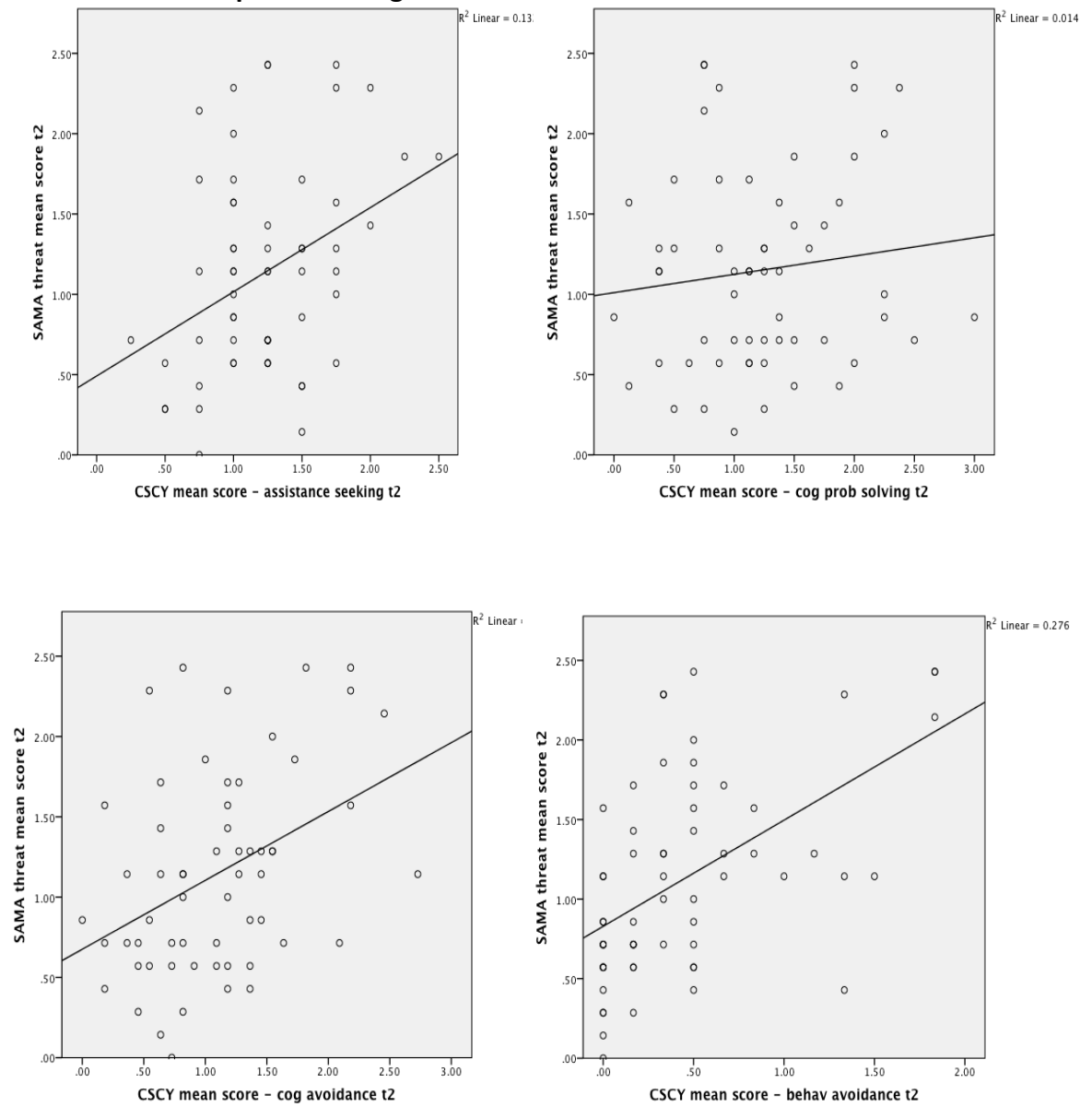


**FIGURE 27: Scatter plots charting SAMA resources to cope subscale and all subscales of SDQ at T3**

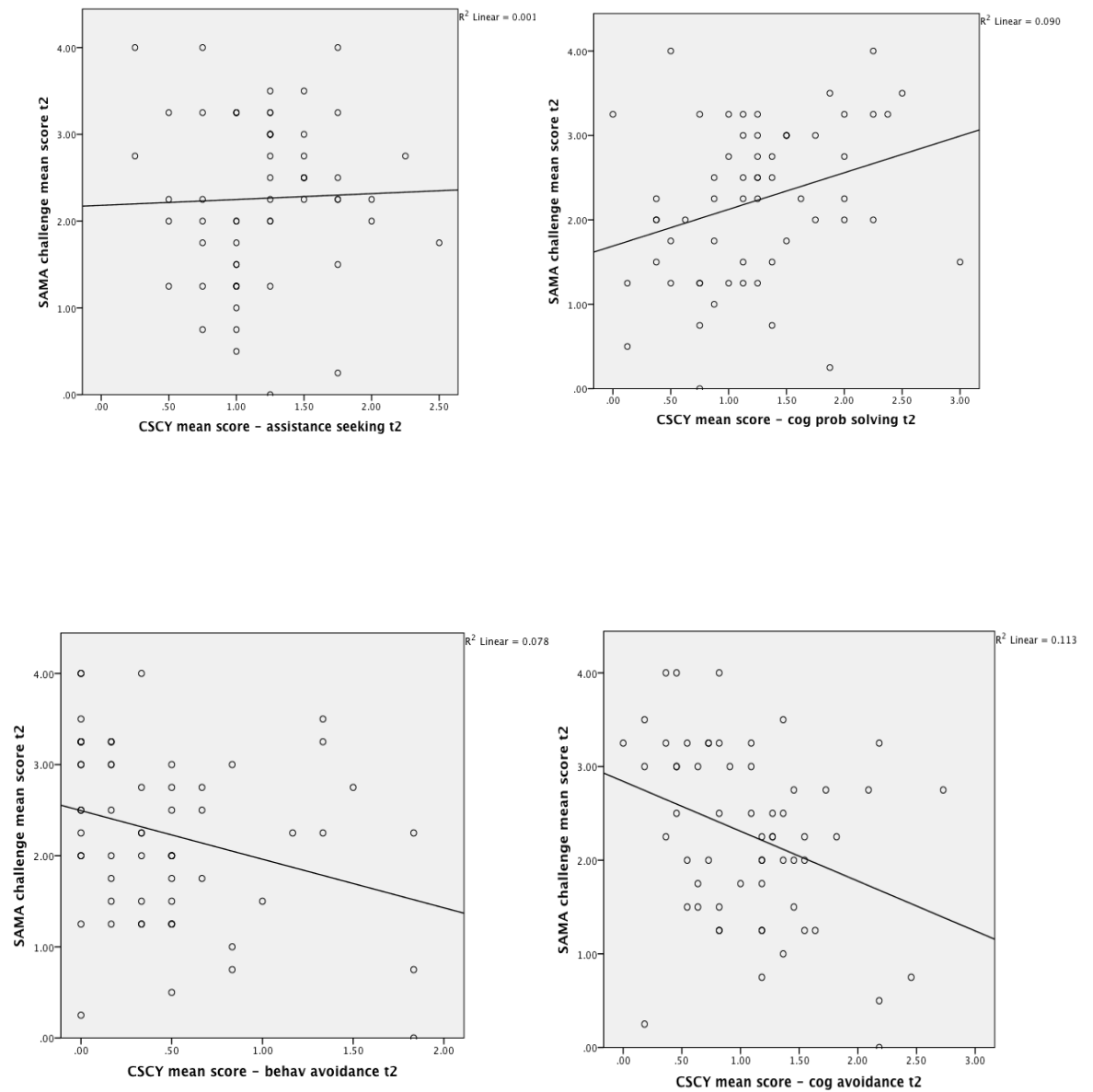


## APPENDIX XII: Scatter plots charting appraisal (SAMA) and coping (CSCY) measures

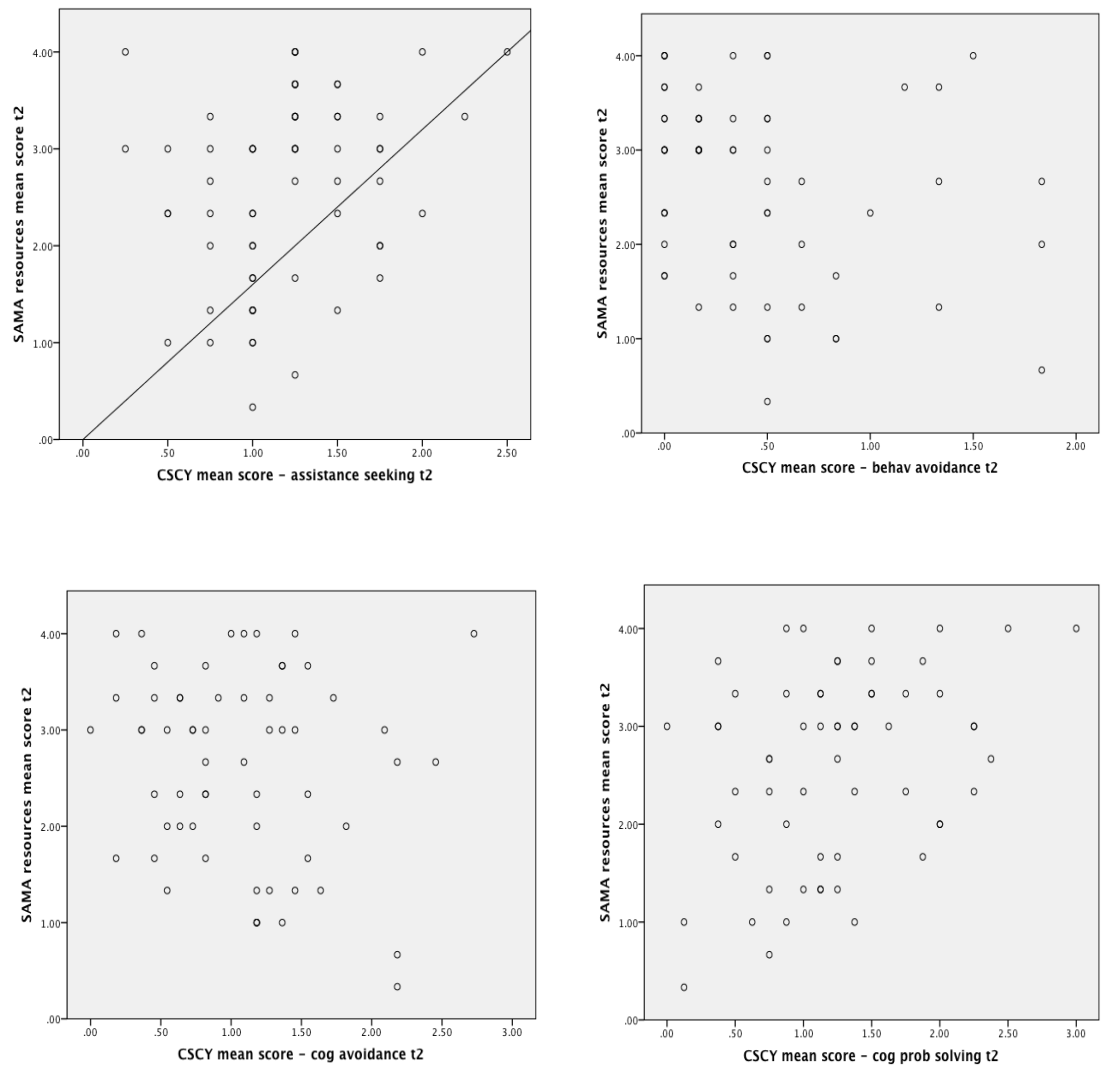
**FIGURE 28: Scatter plots charting SAMA threat subscale and all subscales of CSCY at T2**



**FIGURE 29: Scatter plots charting SAMA challenge subscale and all subscales of CSCY at T2**

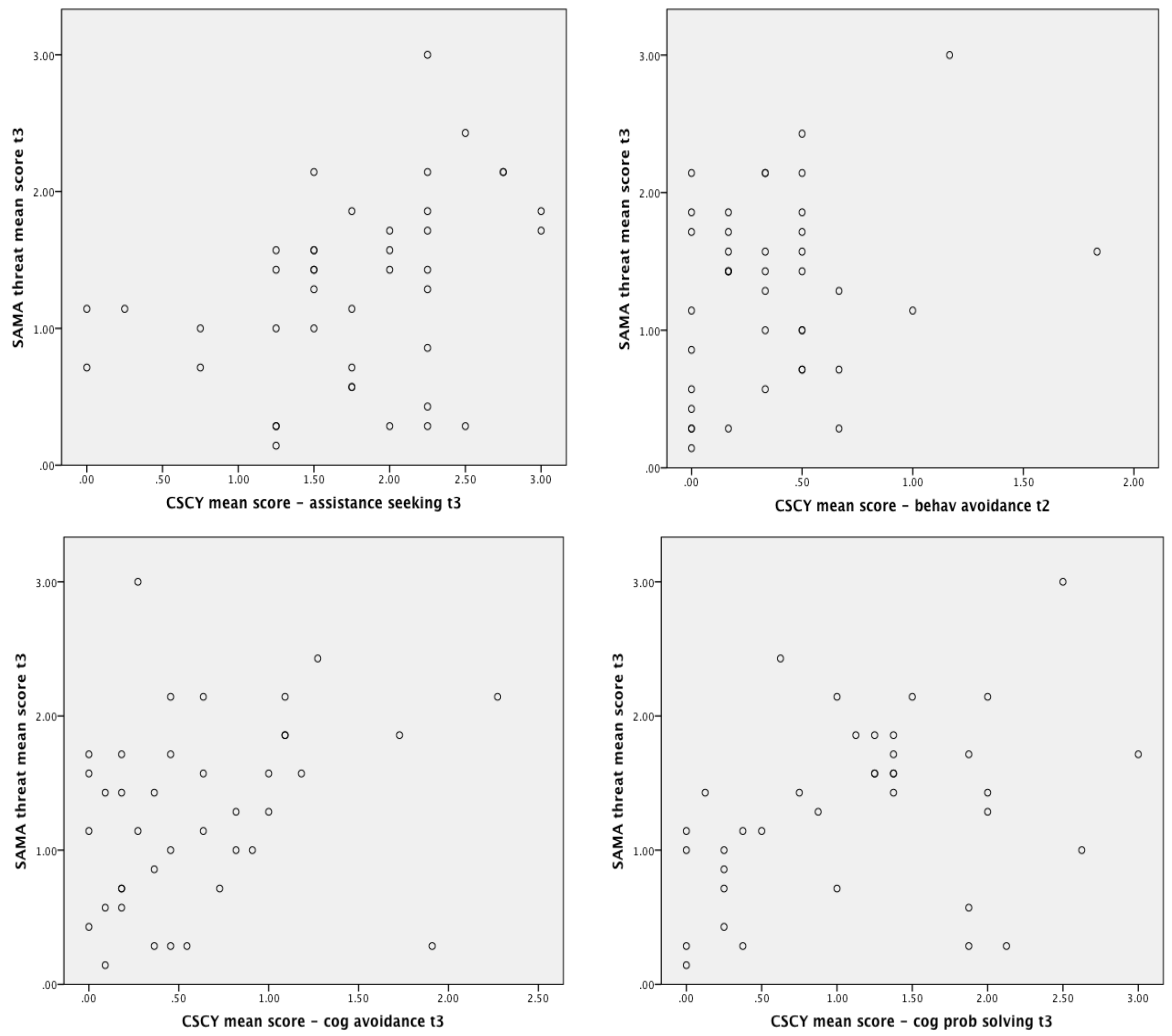


**FIGURE 30: Scatter plots charting SAMA resources to cope subscale and all subscales of CSCY at T2**

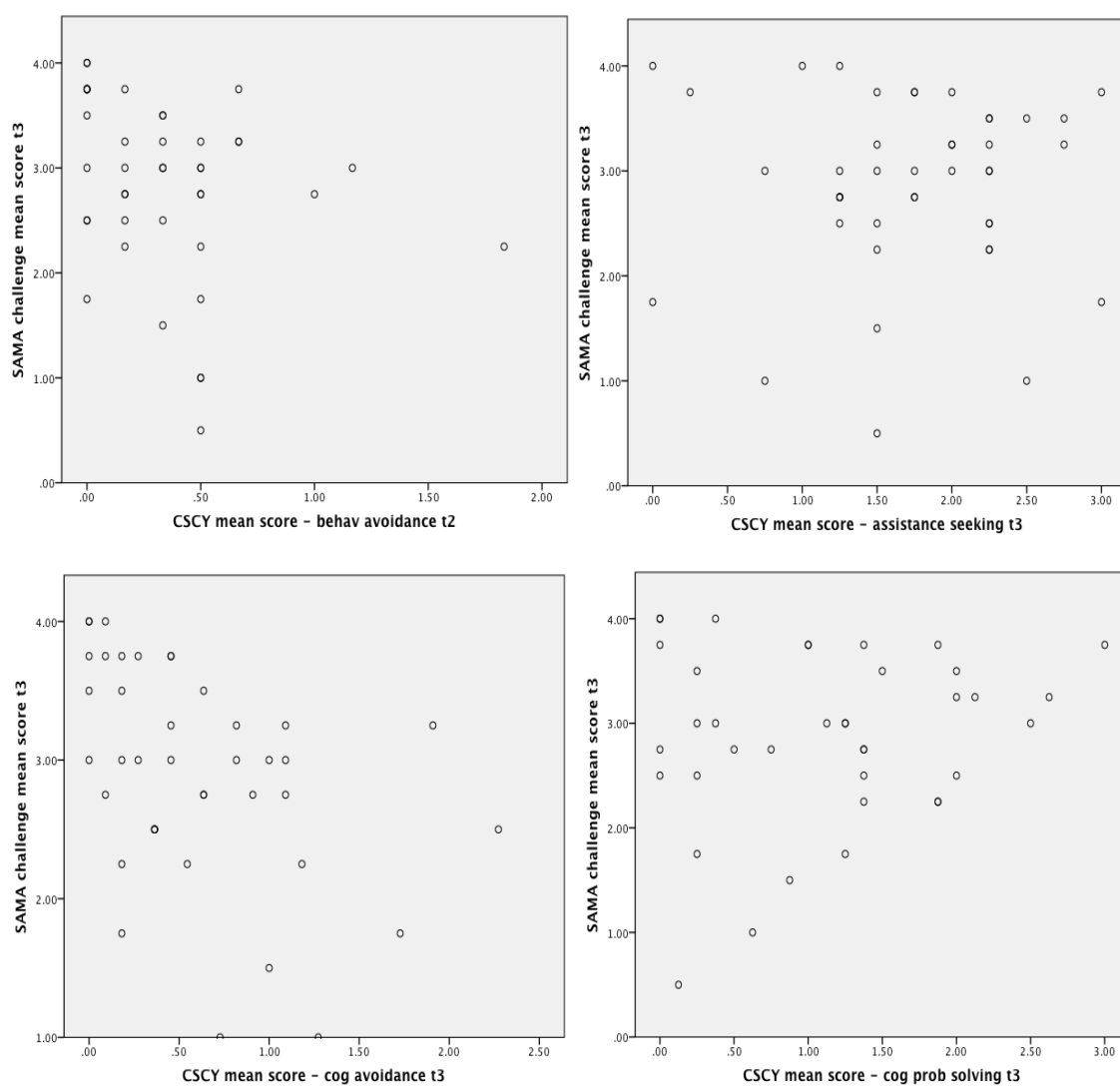




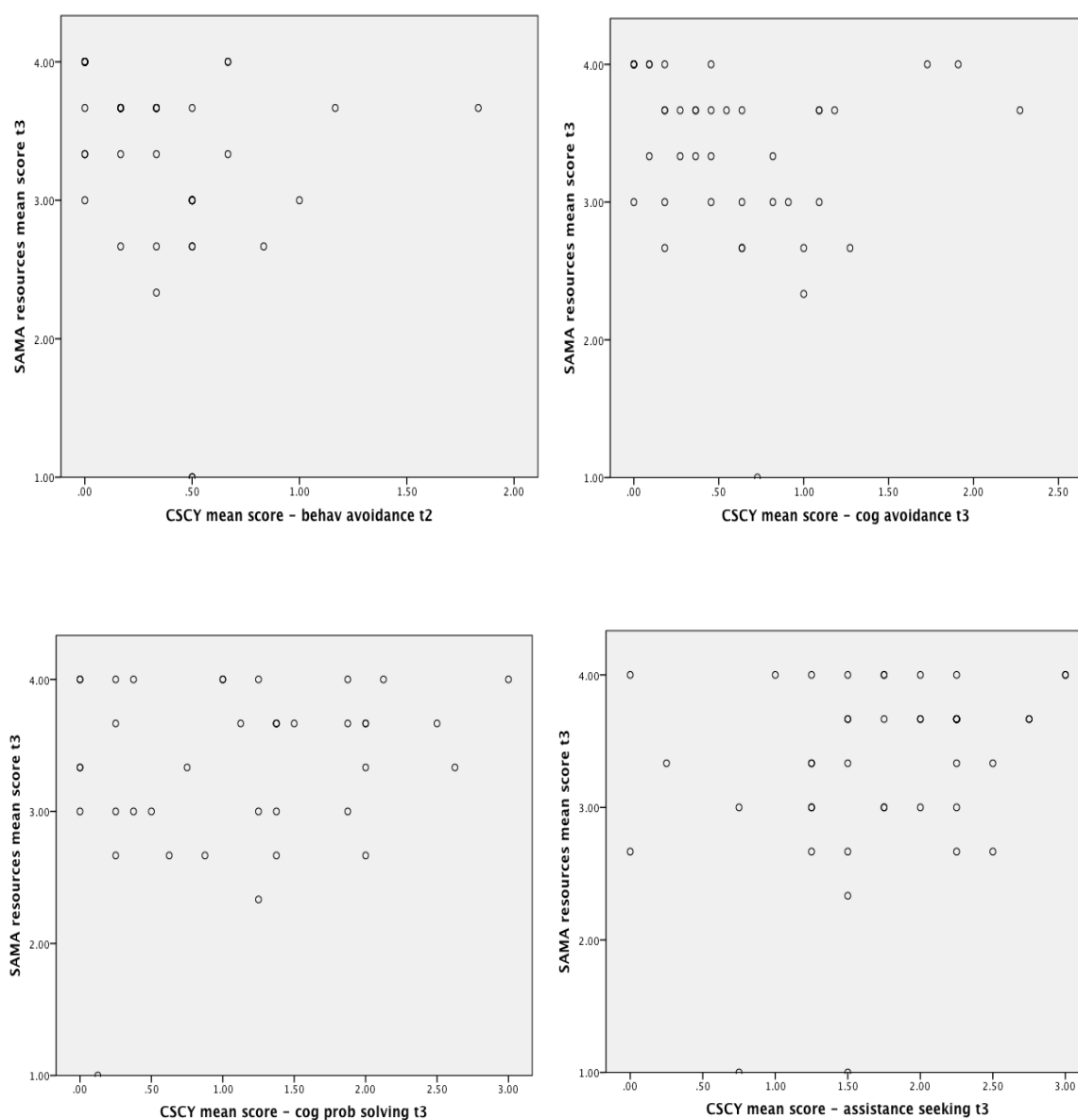
**FIGURE 31: Scatter plots charting SAMA threat subscale and all subscales of CSCY at T3**



**FIGURE 32: Scatter plots charting SAMA challenge subscale and all subscales of CSCY at T3**



**FIGURE 33: Scatter plots charting SAMA resources to cope subscale and all subscales of the CSCY at T3**



## **APPENDIX XIII: Copies of measures used in the study**

### **Stress Appraisal Measure for Adolescents (SAMA)**

*1. I have the ability to overcome stress*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*2. I perceive stress as threatening*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*3. There is someone I can turn to for help*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*4. I can positively attack stressors*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*5. I have what it takes to beat stress*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*6. I feel anxious*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*7. Stressful events impact me greatly*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*8. There is help available to me*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*9. The outcome of stressful events is negative*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*10. The event has serious implications for my life*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*11. I have the resources available to me to overcome stress*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*12. I have the skills necessary to overcome stress*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*13. Stress has a negative impact on me*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

*14. There are long-term consequences as the result of stress*

(0) not at all (1) a little (2) somewhat (3) quite a lot (4) a great amount

## CSCY Coping Scale for Children and Youth

Listed below are some ways that children and teenagers try to deal with their problems. Please tell us how often each of these statements has been true for you when you tried to deal with EXAMS/TRANSITION.

1. *I asked someone in my family for help with the problem.*

(0) never      (1) sometimes      (2) often      (3) very often

2. *I got advice from someone about what I should do.*

(0) never      (1) sometimes      (2) often      (3) very often

3. *I shared my feelings about the problems with another person*

(0) never      (1) sometimes      (2) often      (3) very often

4. *I kept my feelings to myself*

(0) never      (1) sometimes      (2) often      (3) very often

5. *I thought about the problem and tried to figure out what I could I do about it.*

(0) never      (1) sometimes      (2) often      (3) very often

6. *I took a chance and tried a new way to solve the problem.*

(0) never      (1) sometimes      (2) often      (3) very often

7. *I made a plan to solve the problem and then I followed the plan.*

(0) never      (1) sometimes      (2) often      (3) very often

8. *I went over in my head some of the things I could do about the problem.*

(0) never      (1) sometimes      (2) often      (3) very often

9. *I thought about the problem in a new way so that it didn't upset me as much,*

(0) never      (1) sometimes      (2) often      (3) very often

10. *I learned a new way of dealing with the problem.*

(0) never      (1) sometimes      (2) often      (3) very often

11. *I tried to figure out how I felt about the problem*

(0) never      (1) sometimes      (2) often      (3) very often

12. *I figured out what had to be done and then I did it.*

(0) never      (1) sometimes      (2) often      (3) very often

13. *I tried not thinking about the problem*

(0) never      (1) sometimes      (2) often      (3) very often

14. *I went on with things as if nothing was wrong*

(0) never      (1) sometimes      (2) often      (3) very often

15. *I pretended the problem wasn't very important to me*

(0) never      (1) sometimes      (2) often      (3) very often

16. *I knew I had lots of feelings about the problem but I just didn't pay any attention to them.*

(0) never      (1) sometimes      (2) often      (3) very often

17. *I tried to get away from the problem for a while by doing other things.*

(0) never      (1) sometimes      (2) often      (3) very often

18. *I pretended the problem had nothing to do with me.*

(0) never      (1) sometimes      (2) often      (3) very often

19. *I tried to pretend that the problem didn't happen.*

(0) never      (1) sometimes      (2) often      (3) very often

20. *I hoped that things would somehow work out so I didn't do anything.*

(0) never      (1) sometimes      (2) often      (3) very often

21. *I tried to pretend that my problem wasn't real.*

(0) never      (1) sometimes      (2) often      (3) very often

22. *I realised there was nothing I could. I just waited for it to be over.*

(0) never      (1) sometimes      (2) often      (3) very often

23. *I put the problem out of my mind.*

(0) never      (1) sometimes      (2) often      (3) very often

24. *I stayed away from things that reminded me about the problem.*

(0) never      (1) sometimes      (2) often      (3) very often

25. *I tried not to feel anything inside me. I wanted to feel numb.*

(0) never      (1) sometimes      (2) often      (3) very often

26. *I went to sleep so I wouldn't have to think about it.*

(0) never      (1) sometimes      (2) often      (3) very often

27. *When I was upset about the problem, I was mean to someone even though they didn't deserve it.*

(0) never      (1) sometimes      (2) often      (3) very often

28. *I tried not to be with anyone who reminded me of the problem.*

(0) never      (1) sometimes      (2) often      (3) very often

29. *I decided to stay away from people and be by myself.*

(0) never      (1) sometimes      (2) often      (3) very often

### Strengths and Difficulties Questionnaire

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of how things have been for you over the last six months.

Student's name \_\_\_\_\_

Male / Female

Date of birth \_\_\_\_\_

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings			
Restless, overactive, cannot stay still for long			
Often complains of headaches, stomach-aches or sickness			
Shares readily with other youth, for example CD's, games, food			
Often loses temper			
Would rather be alone than with other youth			
Generally well behaved, usually does what adults request			
Many worries or often seems worried			
Helpful if someone is hurt, upset or feeling ill			
Constantly fidgeting or squirming			
Has at least one good friend			
Often fights with other youth or bullies them			
Often unhappy, depressed or tearful			
Generally liked by other youth			
Easily distracted, concentration wanders			
Nervous in new situations, easily loses confidence			
Kind to younger children			
Often lies or cheats			
Picked on or bullied by other youth			
Often offers to help others (parents, teachers, children)			
Thinks things out before acting			
Steals from home, school or elsewhere			
Gets along better with adults than with other youth			
Many fears, easily scared			
Good attention span, sees chores or homework through to the end			

Do you have any other comments or concerns?

**Please turn over – there are a few more questions on the other side**

### **Socially Perceived Necessities subscale of the Breadline Britain Survey**

Respondents tick if the statement applies:

- Cannot afford a holiday away from home
- Cannot afford friends or family around for a drink or meal at least once a month
- Cannot afford two pairs of all weather shoes for each adult
- Cannot afford to keep home in a decent state of decoration
- Cannot afford household contents insurance
- Cannot afford regular savings of £10 a month for rainy days or retirement
- Cannot afford to replace any worn out furniture
- Cannot afford to keep your home adequately warm in the winter
- Cannot afford to replace or repair electrical goods such as fridge or washing machine
- Cannot afford a hobby or leisure activity



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